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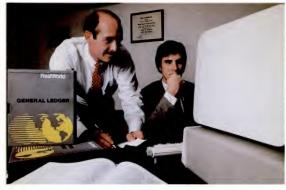
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COVER STORIES



BUSINESS GRAPHICS:

Giving Power to Presentations . 110 In business, seeing is believing. As a result, graphics presentation software is rapidly moving up on the PC best-seller list. Inevitably, an overwhelming number and variety of graphics products have recently become available.

FC Magazine has assembled a panel of seper reviewers to all you in selecting the product that best suits your particular needs. We who looked over more than 30 of the most interesting business-oriented the continues of the most interesting business-oriented than the selection of the most interesting business-oriented than the selection of the selection of the selection of the product parallel selection in the selection of the s

The graphics programs included in this

PRO COLUMNS/DEPARTMENTS

WHAT'S INSIDE 15
A look at the making of PC Magazine.

reports, interviews, and minireviews. FROM THE EDITOR'S SCREEN

THE NORTON CHRONICLES

Gang of Fourteen:
Disk Types for the AT103
Peter Norton / Norton looks at AT addon hard disks



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can be fallible when it comes to spotting small-scale disk errors. Stay alert for the mistakes missed by DOS with the help of DSKWATCH COM.

USER-TO-USER 279
Paul Somerson / PC owners share their tips and short programs.

answers both technical and nontechnical questions from our readers about the world of personal computing.



Studying SAT
Programs 289
Mark Malamudi

Mark Malamudi
Choosing the right SAT
preparation package can be almost as
tough as taking the test itself. Here are a
few clues to help parents and students
make the choice that is best for them.



FINANCE Check Out Hot Tips with Dow Jones 295 Thomas Meyers / The

Dow Jones News/Retrieval service quickly puts valuable market information into the hands of investors at a relatively low cost.



package are listed below in the order in which they're reviewed.

Fast Graphs Draw-It dGRAPH III DR Graph Micrograph by 2Y's Condor Graf Infographics CHOICE ARTPAK Presentation System PC Illustrator Grafax **EnerGraphics** ChartStar Microsoft Chart Executive Picture Show PC Presents! Business Graphics System Executive Presentation Kit PYXEL Visuals RPS Rusiness Graphics heGRAF GrafTalk Hypergraphics Boardroom Graphics TelePaint PC-Draw GSS-Plottalk CHART-MASTER Plotrax 2 Zebra Business Graphics PC-Graph Giraph Business Graphics PFS: GRAPH VCN ExecuVision GRAFIT

GRAPHICS: A Two-Edged Sword239

Kathryn Alesandrini / Graphics can help you make an impact by shrinking mounds of data into comprehensible charts. Some of the graphics software packages are so powerful and produce such professional results that you'd think you have an in-house art department producing them. But be careful: Not every picture is worth a thousand words. Poorly thought-out images can also weaken your presentation and lessen your credibility.

Instrument Families Used with MIDI As of January, 1985



GraffHopper

BUSINESS Safekeeping Your oftware 299 Bruce Gast / Threats to

Graphwriter

your magnetic media abound, and even the office safe may not live up to its name. Here are some ways to prevent possible disk damage resulting from fire or humidity.



Shopping 305 Norvell E. Braschi Price Waterhouse's Legal Tech Seminars explain the complexities of the microcomputer market, helping lawyers choose the right computer products for their work.

Across the Boards311 David Hoffman / Listings of 75 IBM PC bulletin board systems.

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BOOK REVIEW Basic Repairs for Your PC-Too Basic?351 Winn L. Rosch / Two new PC repair books teach you how to locate problems

but don't help you fix them.



TELECOMMUNI-CATIONS Picking the Proper Protocol 355

Percussion

M David Stone Xmodem is the de facto king of errorchecking communications protocols. As is often the case, however, "standard"

does not necessarily mean "best." INDEX TO ADVERTISERS 356

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Cover Photograph: Michel Tcherevkoff

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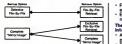
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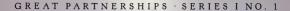
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Flexible Diskette



What's Inside

Despite an epidemic outbreak of various bizarre cases of spring fever among PC's editorial staff, we still managed to give you the big picture on business graphics packages.

pring fever is a pernicious and dangerous disease, especially if you employ many intelligent and idiosyncratic individuals. It seems to manifest itself in 3-hour lunches, sudden outbreaks of lateness, and an uncontrollable urge to stare out the window murmuring, "It must be beautiful in Maine right about now

However, when you're not in Maine. but stuck in an office in midtown Manhattan, there isn't an awful lot you can do about all that fresh air and sunshine trickling through the windows. You've got to find other outlets for your excess energy. And since the crew at PC Mayazine, in spite of the workload, can always find a bit of excess energy to play with, there is always something to do.

For example, assistant editor James Langdell accumulates toys, really sophisticated playthings like inflatable sharks and battery-powered. Rube Goldberg contraptions that make five small plastic penguins slide down a ramp, again, and again, and again.

Technical coordinator Mike O'Cone plays darts. Not content with normal outlets like softball teams, O'Cone helped organize an unofficial and, to the uninitiated, somewhat mysterious dart team called The Perforators. He has yet to tell us exactly what the teams are throwing darts at-and most are not sure they want to know

Executive editor Paul Somerson shuts off the lights. He prefers using his computers in a darkened space. While the early winter sunsets cast PC's offices in fairly perpetual twilight, spring months



pull the blinds. PC staffers are used to it: but the occasional visitor who enters Somerson's office to find him peering intently into a weird green glow usually needs a few moments to recover.

Other Trivial Pursuits

As mentioned before in this column, the copy edit staff plays computer trivia games. Recently galvanized by the release of two new versions, IBM's Trivia 102 and Music 101, they can be seen huddled over a PC in senior copy editor Jean Atelsek's office or after hours in managing editor Barry Owen's office, sometimes joined by assistant editor Charlie Bermant, Somerson, or even publisher Jeff Weiner. Owen has been holding off all comers with geography expertise, while assistant editors Gerald | the packages and separate the business

Carney and Mike Espindle, representing copy edit, are trying to regain the crown from archrivals Somerson and Bermant, representing PC News.

Associate editors Jennifer de Jong, Lisa Kleinman, Barbara Krasnoff, and Stephanie Stallings have meetings. Not that they don't consult during the rest of the year, but warm weather seems to demand frequent business interaction in one of their four offices. (This propensity does not always sit well with executive editor Mike Edelhart, who sometimes suspects that a coup may be in the works.) Actually, quite a few vital issues must be taken up at this time of the year-such as how to get the Plexiglas insulation off the windows, or how to convince editor Bill Machrone that 5hour working days are statistically proven to increase editorial productivity.

Of course, they'd have a better chance of proving their point if they put their statistics through one of the graphics programs covered in this issue. A couple of months ago, we discovered that business graphics software had been accumulating for some time. Three important factors had come to the staff's attention: (1) the state of the art (so to speak) has become sophisticated enough to begin rivaling the graphics produced by professional graphics companies; (2) enough packages are out there to confuse an AT; and (3) if we didn't do something about the pile, we would need a bulldozer to get into the Toy Shop.

A team of expert free-lance writers was immediately called in to sort through graphics programs from the 1-2-3 enhancers from the free-form drawing programs from the font producers. All this activity was overseen by contributing editors Glenn Hart and John Dickinson.

Once the main sort was completed, teams of testers spent 2 weeks creating pie, bar, and Gantt charts with reckless abandon. Somehow, amid plotter problems, skirmishes between pro- and antismokers, and frequent cries of "Don't the people who write these manuals believe in indexing?" the reviewing went relatively smoothly.

One notable program ultimately chucked from the issue gave free-lance writer M. David Stone nightmares. The package featured in center screen the image of a square-iawed, bald-pated man who asks (across the bottom of the screen), "Can I help you, pal?" You then had to touch a mouse-driven cursor to the man's eyebrow, left ear, nose, and

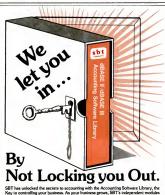
Business graphics software had been accumulating for some time, and if we didn't do something about the pile. we would need a bulldozer to get into the Toy Shop.

so on, to get pull-down menus. The logic of such a system was unassailable-if you could figure out what that logic was. By the end of the second day, PC Magazine staffers were regularly dropping into the Toy Shop to see how far Stone had progressed with the program. By that time, he had been able to turn the bald man a stunning shade of turquoise and was actually drawing small squares on the screen. But that was as far as he got. So it was with a sense of great relief that Stone was finally given permission to abandon ship; his final word on the subject was that the program "is the best argument against icons I've ever seen.'

Several other packages either dropped from or joined the party along the way. giving nightmares to senior copy editor Janet Lewis, who was trying to keep a comprehensive list while balancing marathon meetings with Dickinson about the enlarged Fact Files with reviews of the 36 eventual survivors.

The final collection covers nearly the full range of business graphics programs on the market. Almost all of them offer

preformatted business graphs, and some even have stored images such as automobiles, trains, trees and grass, flowers . It must be so nice in Maine right about now



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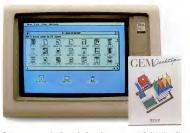


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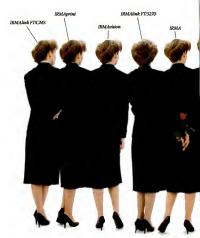
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ute until a condition is mot You already know how to converse with C-Sprite, if you are familiar with Microsoft's Debug. Lattice began with that well-known command language, and then added to it considerably: You and then added to it consider ably: You can work with data in best, as you might expect, and you can also differentiate between C** data types, causing the debugger to treat addresses as pointers, or strings, or long integers, occ., both in display and entry. C-Sprite even has

macros — use your source code variable names in a macro to dump the contents of entire C structures, for example. And or entire c structures, for example. And you can debug through one of the COM ports with a second terminal so as not to disturb your program's display screen. What's more, if you link with Plink86". C-Sprite can even tackle overlays. Program doctors will find plenty of implements to runninge through in this implem kitbag.

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money-making way to become part of the solution. Convert your MS-DOS PC-DOS products with our CP/M-Z80 targeted cross compiler. For a few dollars, you'li double your market in a

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portunity that make this product impor-tant to you, dBC** links C to dBASE. This new product from Lattice creates files which exactly replicate dBASE file design. So dBASE can read and update them. And the reverse. dBC can use any files created by dBASE. Now C and dBase can operate on the same data bases inter-chanceably. changeably.

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Dbase II Compatibility: Dbase III Compatibility:

TEXT TOOLBOX** #1 These Utilities Work Wonders of Organization

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"Grep" looks for text patterns in any number of files. Its powerful expession syntax goes far beyond your text editor! search command. Use of "(, +)" with "-2," will find in all files with "-2" ex-tensions all lines with parenthesized ex-reservors. In marker low and the parenthesized ex-

CVIIE

A Text Editor to Make Your Own

CVUE is a neat screen oriented text editor which does most of the things that a good editor should do, such as automatic scrolling vertically and horizontally, insertion and overtype en-try modes, block detect, undelete and move, and full DOS 2.0 decetory path name support in reading and writing

name support in feating and writing it is easy to lear with a comprehen-sive command meta screen which makes the decommendation or constants. It was the feet of the constant of the con-traction of the contract of the con-traction of the con-tracti

is practical. Anyway, modular source code of structured programs never gets nearly that big. As compensation, CVUE s very compact and fast. It actually r in computers with only 64 KBytes of nemory and uses no sed overlays to perform its full function The power of CVUE is its case of

license, full customization of the keyboard editing commands is offered. And when you take advantage of the Source Code option (found elsewhere in this ad.) the resultant editor can be made truly your own. List Price Our Pri-

nave to write every line of code, because now you've unlocked C's vast storehouse of off-the-shelf libraries and utilities. And you add power: dBC lets you open and process eight index and data files at one. have to write every line of code, because

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sort out the confusion every day and keep your work tidy. CURSES A Screen Management Interface to Swear By

pressions, no matter how many characters lie between. Want to find all function calls? Look for all occurrences of, say, a global variable throughout a program system? Search for all pro-

grams in a directory, use paths to other directories? Find all files on a disk?

'Grep" will grab them all.
"WC" counts lines, words, and

characters in a file and has a checks

"Diff"? You've probably trie

"Diff"? You've probably tried to write one (and then discovered how tangled the logic gets). "Diff" compare text files line for line and reports dif-ferences. It uses complex algorithms to re-synchronize between files after disparities involving any number of line

dispartities involving any number of lines are found. And it outputs a precise list of instructions telling what to do to make two files exactly the same, a list which can be handed to "Ed" to do the job! You'll ultimately find such assistance indispensible. Libe having a librarian to

Prior: \$120

independent of machine character sets so you can test whether a file has een

rred successfullybetween computers.
"Ed" is similar to the well-known
Unix editor. It offers search and repiace
with "Grep!" syntax, block move, reaand write, optional line numbering, append, insert, delete, and this unusual
facility; you can instruct "Ed" to apply
a file of commands to any number of
target files, even complicated changes
and text additions such as those created

Curses is a Lattice creation which manages the screen of the IBM PC in the same fashion as the curses utility of Unix same fashion as the curses utility of Unia and similar operating systems. Use it to adapt programs which call Unix's curse functions for screen management, and need the equivalent library when moved to the PC for recompilation. Or use it when creating software on the PC to assure that it a Unix companible assure that it a Unix companible to the program of the program of the tions and macros which can keep any unities of screen images in memory. Within a screen, Curses employs a va-

Within a screen, Curses employs a vas function set to get characters, wrap lines, scroll, blank lines, highlight — virtually every tool needed to update the screen. The product supports color, and all four memory models. In keeping with the ser-minal orientation of Unix curses, the manager for use with the Lattice C Com-piler whether or not dBASE will ever be piler whether or not dBASE will ever be used in tandem. dBC conces as a library of object modules, with versions for all four memory models. It's a complete set of ISAM routines (that perallel dBASE commands) which create and maintain index and data files. The manual discusses each in detail, and demonstration source files on your disk show how physical screen is re-painted (at high speed) only when your program calls a refresh function.

Writing screen management code let to unspeakable snaris and expressions. Swear off! Let Curses clean up your

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every function is used.

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nes it finds the instruction pointer in

partition.
You are in for some surprises when you discover just how unbalanced the activity is likely to be, and that? why Code Sifter is so valuable. It profiles just where you can best spend time optimizing your code, or even converting to assembler subrouties.
Code Sifter has a number of monitoring code, or even converting to assembler subrouties. ing options. You can tell it to include any

ing options. You can ten it to include any combination of your program, DOS, and BIOS in its analysis. You can specify the sampling rate. Most important, you can tell Code Sifter the number of times to run a program, and between each run discard the less active ranges and re-partition the hot spots, so that you zoom

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Instead, magine making a change deep in a system, and simply celling Left to it. Lold. "O take over, No further than the contract of the contract of

thinking or keystroker. LMK will rebuild your final product, however involved and complex, by doing just what is needed and no more. How? You write a command file

How? You write a command file which express notion to top all the elements comprising your yourn and all elements comprising your yourn and make what object file using what options, what is built into illerate; what is that lated into the final EME file. Through of the last time every action was per-offel ast time the second of the last time the second the time information found in the file direction of the second of the s ject file, for example. Only those elements and their dependents are re-made. All other instructions are bypass-

Inte command the uses a sample, readable syntax — "prog.ob); prog.c S(HDRVS)", for example, says whe source file this object file depends on, and fills the previously defined macro HDRVS into the expression, which be might be a list of files with hardware

drivers, or in another case your preferred string of compiler options. LMK does not care what programing language you use; it's not just for . For that matter, LMK can apply to more than programming. It can be used for any set of tasks which can be ac-

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many jobs simultaneously.

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4 Megabytes of RAM

Dramatic

on-board memory improvements go to bat against highly touted bank-

switching schemes.

BY CRAIG L. STARK NEW YORK-Spring COM-DEX will be remembered as the computer show at which the PC and XT finally acquired multimegabyte RAM capacity, along with upgrades of several popular software packages to make use of it (see "Memory Scheme Breaks 640K," PC Magazine, Volume 4 Number 10, p.33).

The introduction of a memory-expansion card with full

memory-management facilities

for 4 megabytes of on-board PC RAM was one of the more exciting of these developments. Unlike other multimegabyte expansion cards, the All ATI/M card, by All Computers, Inc., of Toronto, is not limited to the "bank switching" technique for extending the PC's memory beyond 640K. However, in addition to being able to handle that "standard" expansion method. All's custom CMOS MMU (memory management unit) chip provides the "protected mode" facilities of the 80286 CPU used in the PC AT. According to Mers Kutt. All's genial president, the PC and the AT are destined for dif-

ferent lines of development. | The AT, with the inherent mem-

ory-management capabilities of the 80286, represents a highcost, high-horsepower, elite route. The PC and XT, by contrast, are less-costly to design for, but, given sufficient memory capabilities, their 8088 can still meet the needs of the highvolume memory market. Like a wily veteran whose fastball is losing its pop, the IBM PC has to develop a crafty knuckler to remain a major league starter in

the years ahead. Bank-switched memory, the currently touted solution to ex-

panding PC memory, is an old and honorable technique. Kutt used it himself in a 1972 micro that ran the notoriously memory-hungry APL on a chip inherently limited to 16K. The trouble is that for really memory-intensive programs such as spreadsheets, bankswitching can only switch 64K memory segments (10 percent of the PC's 640K) at one time.

Moreover, for multi-user or multitasking applications. bank-switching lacks adequate protection to keep what happens in one part of memory from affecting other, simultaneously active parts.

Absolute Protection With hardware-based memo-

ry management, on the other hand, protection is absolute. Further, a single bit can switch

an entire 1 megabyte memory (continued on next page)

The Price Is Right On New Local Area Networks

BY BILL MACHRONE

NEW YORK-Some will call it networking and some will call it disk sharing. One thing everyone will call it is cheap. The Software Link (TSL), based in Atlanta, Ga., has introduced LanLink, a no-hardware solution to inter-PC communication and data sharing. At \$495 for the server and first satellite, with additional satellites costing \$195, LanLink sets a price point that will be tough to

LanLink uses the PC's existing serial ports, taking advantage of a little-known high-speed mode that permits data rates of up to 115,000 bps. LanLink requires no plug-in boards, only a standard RS-232 connector.



Ports of Call There are many ways to configure LanLink, depending on your needs. You can set up a star" central file server with one of the new 4- or 8-serial port cards, or you can daisy-chain them, using two serial ports per machine. There can be multiple servers in the configuration, and you can run programs on the

(continued on next page)

RAM (continued)

map at once, preventing the "thrashing" (frequent uploads and downloads of memory overlays) that can slow the throughput of bank-switched systems. Moreover, as software writers develop increasingly sophisticated software designed for the AT, only memory-managed PCs will be able to run on a bank-switched PC is unthinkable," Kutt observes. Since the All AT1/M card can handle either bank-switched or



of the new software is available, this observer is basking in the luxury of a mere megabyte (expandable to 3.5 megabytes) RAMdisk atop a maxed-out (640K) XT

The All Card is priced competitively, capable of using either 64K or 256K chips, has selectable clock and serial port options, and can even be ordered without the MMU module



server while it provides disk resources. LanLink doesn't mind if one of the serial ports happens to be a modem. It comes with a line-monitoring program that asks for a password before granting a remote user disk access. A batch file restarts the monitor program after each use and drops the DTR line to hang up the phone when passwords are invalid.

When you start the LAN server program, you specify what resources you want to make available to each satellite, including printers. TSL provides printer sharing and spooline utilities.

Uncanny LAN I tested LanLink on my PC AT

with a Datavue 25 portable hooked to the COM1: port and COM2: equipped with a Smartmodem for dial-in operations. LanLink's ease of use was almost uncanny. I connected the serial ports and ran a few programs. Next thing I knew. I could access the AT's hard disk as drive C: on the Datavue. I ran all my favorite programs over the LAN without a bitch. The load times of course were a hit slower than loading from floopy disk. but speed isn't the main thrust of this kind of network. You move

files from machine to machine with the DOS COPY command even when connected by modern. What could be simpler: LanLink has one of the most

humane copy protection schemes I've seen in a long time. You can evaluate the program as much as you like-it times-out after 15 minutes or so of use, after which you must restart the machine. If you don't like LanLink, you can simply return it to the dealer. When you decide to keep it, you rip open an envelope enclosed in the package. A password decrypts an unprotected version, with no

LanLink is an affordable, practical solution to many lowend networking problems. It is especially well suited for situations where the passing of moderate-sized files and occasional remote access are the primary concerns.

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them. Finally, if the UNIX op- | erating system becomes a stan-

memory-managed programs. Kutt seems to have stolen a dard, memory management will march on the major board makbecome a prerequisite. "UNIX ers. In the meantime, before any

directly from All Computers Inc. 110 Bloor St. West, Suite 501, Toronto, Canada M5S 2W7, (416)960-0111.

New Information Group Shows Yankee Ingenuity

NEW YORK-The Yankee Group, a Boston-based communications and consulting firm, has announced an electronic publishing and messaging service called Yankee Net.

Yankee Net distributes research, newsletters, and news analyses that are prepared by the Yankee Group staff. Users obtain access to Yankee Group research and data with a key-word search function. An electronic mail system is also part of the Yankee Net subscription, allowing for two-way interaction between subscribers and analysts at the Yankee Group. Users can leave mail for the analysts and receive answers to specific questions.

Howard Anderson, founder and president of the Yankee Group, says that the present user base consists of 450 companies and individuals that are already Yankee Group clients. He expects the Yankee Group's share of the addressable market

to be 6,000 users by 1990, out of a notential user base of 60,000. Anderson expects the market to grow at a rate of 20 percent a year.

It's Semi-Official: IBM Has Made 2 Million PCs

Trying to get sales figures from IBM is like trying to pry supper from a python's mouth. In fact, true to its corporate form, Big Blue usually protects such data as vigorously as its copyrights. But every once in a while, some numbers do leak out-and this time the source is none other than the company itself.

In the premiere issue of the IBM Entry Systems Division inhouse publication, ESD News, a photo caption saluted the company's two-millionth PC as it rolled off the assembly line in Boca Raton last March No fur-

Yankee Net can be accessed from any device with ASCII communications, such as a personal computer, word processor, or teletypewriter. Cost for a I year subscription to Yankee Net is \$1,900 per person for 750 minutes. There is a charge for additional minutes thereafter.

-Virginia Dudek

ther comment was included, but none was really needed. The mention could have easily slipped by unnoticed, hidden

away as it was on the newspaper's back page. Nevertheless, it should cause some industry observers to undate PC sales estimates in their files.

A check with the consulting firm, Future Computing, Inc., in Richardson, Texas, put its estimate of PCs in use at approximately 1.490,000 (at the end of the first quarter of this year). Either the number is way off or IBM is sitting on a stockpile of

PCs that it will have to unload before introducing a PC succes-Pick your prophecy. -Martin Porter

Publisher Faces Lotus Lawsuit

BY CHARLES BERMANT

CAMBRIDGE, Mass.-Lotus Development Corporation has accused a small computer book publisher of copyright infringement, threatening legal action unless the publisher withdraws all copies of its simplified Lotus manual. Refuting this, Management Information Source, the publisher of The Manual: Lotus 1-2-3, claims that Lotus action is an attempt to stifle freedom of

The Manual: Lotus 1-2-3 is one of six similar books published by MIS of Portland, Oregon about popular software programs. The books claim to be better indexed and easier to understand than the manuals supplied by the software publishers themselves, MicroPro's Wordstar and Ashton-Tate's dBASE II and Framework are also the subjects of MIS manuals; neither of these companies, however, had at press time seen the

manuals. Unlike Lotus's 1-2-3, Wordstar and dBASE II are not convprotected. This raises the possibility that inexpensive alternative manuals could encourage unauthorized large scale program duplication. MIS publisher Robert E. Williams, however, denies that his books promote this sort of activity. Furthermore, he maintains that The Manual: Lotus 1-2-3 contains "25 percent more information" than Lotus supplies.

Lotus Alone

Lotus disagrees, claiming that The Manual adds nothing to Lotus's 1-2-3 package, and, in many sections, only rewrites the company's proprietary documentation. According to Lotus's general counsel Lindsey Kiang, a multipage document that shows specific incidents of plagiarism has been prepared by a group of outside lawyers. Kiang, who would not release that document, says, "It's ment. They used different words, but that doesn't change the fact that the material has

been plagiarized." MIS, which has five employees and has put out ten books annually since 1981, published the Power Of book series, which deals with a variety of software programs. Williams, who received the Lotus warning after trying to advertise The Manual in a new magazine published by Lotus, feels that he is the injured party. He also acknowledges that his small company would suffer if forced to engage Lotus in a costly legal battle.

Harpooned

The Manual has a low-budget flair down to its white-on-black cover lettering and the paper keyboard template users must cut from the front of the book. Its publisher claims that it is free of complicated computer verbiage and could be used either alone or in the same way that a

student might rely on Cliff Notes to study Moby Dick.

"Our book is better indexed than the Lotus manual," he says. "It's organized differently, with different command structures.

"Many people have recently told me that they are using our book and have put the Lotus's manual aside.

MIS was given an April 20 deadline to respond to Lotus's charge. After double-checking the book for possible copyright violations and determining there were none, MIS attorney Dan Chernoff of Portland, Ore., wrote Lotus that its action 'smacks loudly of antitrust. Williams and MIS are now poised to pursue the case to its conclusion.

"We're not out to do the wrong thing. That's not the intent of the product," he says. "But we're not backing down. The stuff that Lotus came to us with at first was not copyright infringement. I don't know what Lotus sees as its copyright. If they say the whole book is copyright infringement then we'll have another battle.

"We don't send this kind of letter off lightly," says Kiang,





referring to an April 5 com nication stating that Lotus intends to pursue the matter to its fullest legal remedy. "We do believe in freedom of the press. But copyright laws exist for a purpose: to protect original work. We want to protect our property, we aren't interfering with anyone's freedom of expression.

Lotus, Software Arts In Spreadsheet Merger

Ashton-Tate also acquires Forefront.

CAMBRIDGE, Mass.-The company that made the first electronic spreadsheet and the company whose spreadsheet replaced it at the top of the bestseller charts have joined forces. In April, Lotus, maker of 1-2-3, acquired Software Arts, creator of VisiCalc. Lotus will take over the marketing and support of VisiCalc, TK! Solver, an equation-solving program, and Spotlight, a desktop organizer.

According to the principals involved, the sudden acquisition was decided during a plane ride that Dan Bricklin, chairman of Software Arts, and Mitch Kapor, chairman of Lotus, shared on the way to the April Softcon software show in Atlanta

"The users will be happy. Lotus is happy, and I'm pretty sure I'll be happy." says Bricklin. Both Bricklin and Software Arts co-founder and vice-chairman Robert Frankston will join the Lotus software development team. Lotus will distribute Software Arts software products along with its own software through Lotus's regular dealer channels.

'It looks like the big fish are buying the little fish," says Joe Harmon, vice president of merchandising at the Dallas-based Compushop, the chain of 53 retail computer stores that was itself recently acquired by Bell

Whole Lotta Shakin'

This shakeout theme was reiterated by Sy Merrin, president of Computerworks in Westport, Conn. "We're looking at a trend," he said. "Most of the software companies can't make it on their own. You can't just be a good product anymore. You have to be very big to provide marketing and support. I expect to see a lot of mergers. Even if they don't take the software, they'll take the talent." Another notable corporate

acquisition took place on the West Coast, where Ashton-Tate bought Forefront Corporation of Sunnyvale, Calif. Ashton-Tate has had an interest in Forefront since August 1983. Forefront is the developer of Framework, which Ashton-Tate bought and has marketed since July of 1984. Ashton-Tate has now acquired the entire company. Forefront's offices. will remain in Sunnyvale.

-By Virginia Dudek

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NEWS IN BRIEF BY JANE MINTZER

Bell Atlantic Plugs Computers Bell Atlantle is entering the computer specialty retail market by acquiring

CompuShop, a Dallas-based computer specialty store "We are very pleased with the acquisition and with its long-term potential," says CompuShop corporate secretary, Bill Chambers. Alice Brown, vice-president of the information services firm Future Computing, Inc., says that the acquisition by Bell Atlantic

comes at a key time. "Just when the market is open to new strategies, CompuShop will have the resources to expand into new regions and pursue selected vertical markets." CompuShop currently has 55 stores, but Chambers says CompuShop will have over 200 stores nationwide by 1986.

Benefits of the PC Plan . . . Insurance giant Met-

ropolitan Llfe has designed a computer-based MetLife SHOW-CASE Communications Service. Through interactive computer ter-



A SHOWCASE computer Kinsk

well as individual benefit op-A unique feature of SHOW-CASE, you can calculate your

CASE is its forecasting capabilities. For example, with SHOWnet weekly pay depending upon what savings plan you use and illustrate the rate of growth of the savings plan depending upon how much of your salary you are depositing to the account

Metropolitan will provide an individually designed software system based on the needs of the company requesting the system. The system runs on an XT with an easy-to-use keyboard designed by Telecomfort, Inc.

According to Pamela A. Keeler, the head of the advanced benefits communications department, the computer terminals are placed in kiosks with only the keyboard in easy reach of the employee. For more information on setting up a SHOWCASE system, contact Metropolitan Life Insurance Co. at One Madison Ave., Area 3E, New York, NY 10010, (800) 847-8285

IBM Surrenders New Recruit IBM has

agreed to sell the military computer division of its Rolm Corp. to the Loral Corporation, a military contractor, for about \$100 million. Last year, IBM announced its intention to acquire Rolm, a telecommunications equipment manufacturer. The Justice Department reviewed the sale for possible anti-trust violations and determined that Rolm's military-specific division would overlap with IBM's existing Federal Systems Division, which sells computers to the government. IBM agreed to sell that part of Rolm, and in early April the deal with Loral was announced.

Congress Axes Computer Log Both houses of Congress have voted overwhelmingly to repeal the current tax law that allows you to deduct a home computer as a business expense only if you can prove that it is used for business purposes at least 50 percent of the time.

Presently, the IRS regulation that went into effect on January 1. 1985, states that to prove this percentage, you must keep "adequate contemporaneous records" of the time and purpose of computer use. The legislation repealing the rule is being reviewed by a joint Senate-House committee.

Lotus Blossoms Out In another move to expand beyond its known forte as a developer of business and professional software, Lotus Development Corporation has just formed a new engineering and scientific products division (ESPD). The new division will address the analytical and task-oriented computing needs

of engineers and scientists. Sandra Gunn will head the new division. She is being promoted from director of marketing services to vice president. Working with her is Glenn Patch, former director of new technology and product development at Interactive Data Corp. Patch will be the ESPD's director of product planning and development

The division is looking to other companies to assist it in its new ventures. "Lotus has already begun marketing efforts by working with other developers, manufacturers, and vendors

who currently support engineering and scientific computer users." says Gunn. The first product that the new ESPD will market is TK! Solver, the equation-solving program for engineers and scientists developed by Software Arts, a company Lotus recently acquired.

Tough Compatible . . . Action Instruments, Inc., has introduced what they are calling the first IBM compatible diskless computer for remote, harsh environments. The BC-10 is designed with a bubble memory card that emulates the performance and features of a hard disk. The cards are available with either 128K or 512 K bytes of user memory, and up to four cards (2 megabytes) can be installed. The CPU card also includes up to 256K of RAM. Data can be transferred to the bubble memory via



Action Instrument's diskless BC-10 is built to weather adverse conditions

an IBM PC serial link, a portable floppy drive or by exchanging or adding cards.

Prices start at \$2295 for the basic system. Initial deliveries are scheduled for late summer. Further information can be obtained by contacting Action Instruments, 8601 Aero Drive, San Diego, Cal 92123. Their telephone number is (619) 279-5726.

Borland's Philippe Kahn Talks of Future Stock



BY VINCENT PUGLIA

NEW YORK-At an April 10 conference held here, Philippe Kahn, head of Borland International, preannounced his company's intentions to market a new Sidekick Plus program as well as a number of programming languages. The projected delivery date for Sidekick Plus is July or August. Kahn also implied that Borland will release several other new products and has been toying with the idea of still more, the most notable of which is a three-dimensional spreadsheet. In all, Borland expects to have from ten to fifteen new products on the market by

the end of the year.

Sidekick Plus will not be just
an enhanced Sidekick According to Kahn. "Sidekick Plus is
to Sidekick what Symphony
should have been to 1-2-3."
Nor will Sidekick owners need
to plunk down the full amount
for the new version. Kahn
promises. A reasonable upgrade
policy for registered Sidekick
owners will be willable." Blee
overcharging its customers,"

In addition to the features found in its predecessor, Side-kick Plas will include a capability that allows you to create your own Sidekick. No longer will you be limited to one notepad, or, as it is now being called, thoughtpad. You will be able to configure as many as ten. The

new product will provide a window manager that allows you to partition your applications into a least fifteen areas: a business calculator, an IRS log system for tax purposes (if the IRS ruling on logging personal computer use is still being enforced at shipping time. and a number at shipping time. and a number IRS of the comtact of the computer of the computer use is still being enforced at shipping time. and a number to the computer of the comtent of the computer of the computer of the comtent of the computer of the computer of the comtent of the computer of the computer of the comtent of the computer of the computer of the comtent of the computer of the computer of the comtent of the computer of the computer of the comtent of the computer of the computer of the computer of the comtent of the computer of

On top of that, Sidekick Plus will include two advanced features that Kahn believes most people would consider impossible in such a system. A clue: one of those features will be a great aid when dealing with Dow Jones or Comuserve.

Speculator's Market

Kahn never actually stated what those two features would be, thus encouraging speculation. Based on other things he said, observers were predicting that one of the features will be a multitasking capability for using electronic mail. In essence, this feature should permit users to receive and send mail while still working with other software applications. Speculation on the other feature ran from prediction of a text scanner for finding information quickly to a capability for creating ad-hoc databases as well as providing automatic transfer of data between Sidekick Plus's databases and outside databases

Also expected to be released by Borland before the end of the year are a number of programming languages. Among them are C, ADA, Modula2, assembly, and BASIC. Each implementation is expected to offer the same high quality as Borland's popular Turbo Pascal package.

Gee! 3-D

The three-dimensional spreadsheet was never formally announced by Kahn. However, it was plain that he is very strongly considering such a product. When asked whether the product would be a clone of Lotus's 1-2-3, he said, "Borland is not doing a Lotus clone. We never make clones of any of the control of the control of the control of the control of the could correct many of the faults found in current packages as well as offer entrop and the could correct many of the faults found in current packages as well as offer as well as force of the could correct many of the faults found in current packages as well as offer as well as force of the faults found in current packages as well as offer as well as force of the faults found in current packages as well as offer as force of the faults found in current packages as well as offer as force of the faults found in current packages as well as offer as force of the fault of th

new innovations.
As an example, he suggested a spreadsheet that had only three

active cells. This proposed product, then, would recalculate and save only those three cells rather than the entire 10,000. He stated it should be viewed as if it were a Rubic's Cube, thus implying three-dimensional capabilities.

LAN Plans

Some of the other products Borland is considering will probably be configured for the IBM Network system. As Kahn noted, Borland likes to create tools that it can use, and since it is installing a local area network, it makes sense to think in terms of software that can take advantage of a LAN.

Kahn stated that Borland will continue with its present policy of selling software without copy protection. He feels that a copy protection scheme is "a tax on honesty." and that it is like going into "a grocery store, and, because there are some shoplifters, you get searched when you go out."

A SixPack and a Sidekick to Go

SAN JOSE, Calif.—From now on, when you pick up a six pack, you'll get a sidekick as well. AST Research has cntered into an arrangement with Borland International, publishers of Sidekick, to include that desk management program with its SixPackPlus

multifunction board SixPackPlus, retails for \$395 and includes memory expansion up to 384K, serial and parallel ports, a clock, and print-spooling capabilities. AST estimates that 400,000 boards are in use. The noncopy-protected version of Sidekick, to be included in the package, retails for \$84.95. Customers purchasing Six-PackPlus boards currently in inventory will be able to get a copy of Sidekick by demonstrating proof of purchase.

Tim Mahoney, vice-president of maketing and sales for Tecmar in Cleveland, another major manufacturer of expansion boards, called the move "good strategy," pointing out that Tecmar has always packaged software with its multifunction boards.

Other competitors dismissed the move. "Our experience is that bundling software and hardware doesn't work," said Michael Zachan, director of product marketing for Persyst in Irvine, Calif.

"People buy hardware and software separately. We're not too concerned about this."

"There always has been a trend to throw software in with hardware." 'says Quadram president Leland Strange. "I don't know how successful this has been. I think that it tends to devalue the software because it's offered for free it isn't worth anything. But there are advantages to Stdektek. it's a good prod-

Strange said Quadram, in Norcross, Ga., had no plans to bundle software with its new line of multifunction boards. —By Charles Bermant

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Five New Programs Give PCs the Personal Touch

THE SHORT REPORT

BY PHIL WISWELL

A word processor may be a wonderful tool-it helps churn out more documents in less time-but it doesn't necessarily improve the quality of your writing. RightWriter does. It is a "style processor" that analyzes documents produced by WordStor, Volkswriter, PC-Write, EosyWriter, pfs:write, Microsoft Word, Perfect Writer, WordVision, XyWrite, EDLIN, and all standard ASCII text editors for errors in grammar, style, usage, spelling, and

RightWriter (DecisionWare, Inc., 4030 Gulf of Mexico Drive, Longboat Key, FL 33548; for PCs, XTs, and compatibles; \$75 plus \$3 handling: requires 96K RAM, DOS 1.0 or later) has just one command, the word RIGHT. For example. I typed the first paragraph from The Sun Also Rises into WordStor, saved it as HMINGWAY.WS, exited WordStor, typed RIGHT HMINGWAY WS and waited 30 seconds. A screen summary reported, "Readers need a 7th grade level of education; strength of delivery could be improved; the writing is complex and difficult to read; and many adverbs are being used." RightWriter also created a file called HMINGWAY OUT, a "marked up" copy containing specific comments-such as "Long sentence, 34 words," or "Weak. Consider rephrasing. "-that I could call up and edit with WordStor or the appropriate DOS commands. The writer is free to ignore or incorporate the program's suggestions. Hemingway would obiect, but RightWriter is an idea whose time is long overdue.

PC-Desk

If you equate freeware with slipshod programming, PC-Desk will change your mind.

PC-Desk (Software Studios, Inc., 8516 Sugarbush, Annandale, VA 22003; for PCs, XTs, ATs, and compatibles; \$25 ; requires 64K RAM, DOS 2,x) has the necessary features-clock. appointment calendar, address book, letter processor, telephone directory, phone dialer, and calculator-and all are extremely easy to use in this menudriven system. The active file (about 200 clients) is kept in RAM. But the key word for success with PC-Desk is convenience. For example, from a client's screen record you can send

like myself in one evening Commands include four intensities and 100 brush sizes for drawing lines, circles, arcs, and rectangles, plus fill/copy/move commands. A library of flowchart symbols and a blank library are provided for cut-andpaste operations. Cursor keys must be used for input. Still, it is very easy to create precise geometric figures because cursor xv coordinates are always on screen. Using the coordinates to closely approximate points on a graph, you can easily fudge business graphics. The Drowing Tables (K Software House,

him a stock letter or have your

modem call him with a single keystroke. PC-Desk prints directories, labels, envelopes, and

The Drawing Tablet A major feature missing from

desk organizer software is graphics-the ability to draw on screen and print the results to accompany text. The Drowing Toblet is particularly well suited for hard copy graphics because it uses the highest resolution available, 640 × 200 pixels, and prints in three sizes, though usable printers are limited to Epsons, Geminis, and compatibles.

The Drowing Tables is a menu-driven, two-color mechanical drawing program that can be mastered by artistic bores

Rt.#2, Box 83B1, Unionville, TN 37180; for PCs, XTs, ATs, and compatibles: \$49.95 plus letters with mail merge abilities. \$3 handling; requires 192K RAM. DOS 2.x) also allows you to change foreground colors

to imitate a monochrome VDT. Career Directions

I didn't think I'd enjoy Career Directions-sort of a computerized high-school guidance counselor-but after completing the program, I realized it had done a better, more-thorough job than my high-school guidance counselor did. Among the two dozen careers it suggested 1 investigate were: Columnist/Commentator, Newswriter, Reporter, Geographer, Anthropologist, and Horse

Trainer. And you don't have to

be 18 years old; those seeking a job change will also benefit from Coreer Directions (Systems Software Associates, Inc., 723 Kanawha Blvd, E., Charleston, WV 25301; for the PC, XT, and PCjr; \$89 plus 10 percent charges; requires 64K

RAM, DOS 1.1 or later). First, the program conducts a guestion-and-answer session on the type of work you enjoy, your interests, skills, and abilities, time you are willing to train, and so forth. Then it searches the database of 460 jobs, from Able Seaman to Zoologist, flagging those that match your criteria and printing a list. From the list, you can look up and print information on selected jobs. Finally, Coreer Directions advises you on whether to enter college, vocational school, or the job market, and prints forms to get you started.

Olé

adapter).

How often do you find yourself thumbing through the DOS manual in the middle of a project? And how often do you find what you're looking for within a few seconds? If your answers are "frequently" and "never," hire a private tutor. Can't afford one? Check out Olé (HyperGraphics Corp., 308 Carroll Blvd., Denton, TX 76201: for PC's XTs ATs and compatibles; \$69.95 plus \$3 handling; requires 256K RAM. DOS 2.x. and color/graphics

Olé stands for On-Line Encyclopedia, a DOS 2.x tutorial/ on-line help facility that is just what many beginner-to-intermediate DOS users need. When active. Olé resides in RAM. waiting for the Alt-O signal to take over the screen from whatever application you have running, which makes Olé considerably more valuable than "DOS-on-a-disk" programs. You can page through the entire tutorial, covering DOS from "backslash" to "wild card" with text, graphics, and animation. Or you can look up information directly-either DOS commands or general subjects. When you find what you need, a single key brings back your original application. A very,

very helpful program.

EDITED BY VIRGINIA DUDEK

PC Symposium

Ask the experts.

That, in a nutshell, was what PC Magazine did when we recently posed our PC Symposium questions to over 100 leaders in the microcomputer

industry.

From time to time we will be publishing predictions, forecasts and just-plain-lucky guesses from those people most directly involved in developing, manufacturing and selling products for PCs. These experts will be providing sage answers to such questions as:

What will your computer system be like in five years? Will hardware and software prices fall dramatically, and, if

so, when?
Will there ever be a substantial home computer market?
What unheralded software or hardware product now on the market is deserving of becoming

the next 1-2-3 or WordStar?
In this installment, PC Magazine posed the question: "What is the biggest area of opportunity in the computer industry today?"



Safi Qureshey, President AST Research, Inc. Irvine, CA

Many tasks are still handled as they were in the Stone Age, such as setting up meetings and telephone messaging. All this can be done on computers today, but we need integrated software and education for users. To do this, we need applications software and communications standards,

Bill Krause, President 3Com Corp. Mountain View, CA

The most significant area of growth in the PC industry over the next 3 to 4 years will be network servers. There is currently very little competition in that field. Second, personal communication software, like muppets (multiuser personal productivity tools), an area of software made possible by local networks, will be to LANs what VisiColc was to standalone PCs. Third, I see integration of the telephone into PC telephony applications. But more breakthroughs will be required.

Steve Westling, Manoger ComputerLand Tollahassee East, FL

Visual data and voice communications from a computer on your desktop may be a reality in the next 2 years. Also available will be portable mass storage. You'll be able to carry 10 megabytes in 3 your briefcase.

Jake Geller, Ph.D, Choirman Fox & Geller, Inc. Elmwood Park, NJ

I think there's still a lot to be done to make it easier for humans to communicate and be productive with computers.

> Dick Carrall, Manager CamputerLand Des Moines, IA

Computers are not intended to be single-user

systems, even though they are called "personal computers." People want to make use of what PCs were intended for. Networking will bridge the gap we faced 5 years ago, which was the inability to effectively use the amount of information compiled.



Richard Wolfson, President Harvard Software, Inc. Littleton, MA

Success will come to whomever can make real progress in convincing management that computers are management productivity tools. Small business is another area that needs to be convinced.

Jim Dunne, Monoger Businessland Tompa, FL

f f There are not a lot of people doing much with networking right now. Those who address it will carve a share of the market for themselves.

Daniel Koneshiro, Owner CamputerLand Oohu. HI

The biggest area of opportunity is in the training of people who have or plan to get computers. This is inherent in the fact that major retailers have focused on business sales and now see the need to train for home use. With the possibility of hooking into the cable network, this is very cost effective.

James Robb, Store Monager Entre Charlotte, NC

I think most small businesses don't have computers because they are intimidated by them. When they become simpler, people will want to use them. When I was in high school, they taught typing. And I'm sure that before that, people were afraid of typewriters. It's going to take that kind of education to make people feel comfortable.

James Busby, President DataSauth Computer Corp. Charlotte, NC

I think the cream has too of general computer applications. Now people need to focus on a specific market, focus on a specific market, nomineal, and convenient for a particular user. From time to time, you'll see improvements in technology, but no quantum breakthrough; that's not the major problem in the industry. We must make the custom-

Martin L. Deon, Chairman Summa Technologies Beoverton, OR

I am very disturbed at what I see happening in the software industry. People keep reinventing the same products. New products are what keep this industry exciting and growing. Manufacturers are making better, easier-to-use products but not new ones. The result is that the consumer is getting bored.

Don Bryson, Vice-President Mouse Systems Corp. Santa Clara, CA

In the immediate future, products will be easier for the first-time user to learn. The mouse is a good example. You can just sit down and use it immediately. The combination of mouse and software will fully utilize the plain style of interface.



Tim Cloonan, Manager Personal Computer Center Overland Park, KS

f l think you'll see more laser technology incorporated into less-expensive printers. Ink jet printers. Ink jet printers.

Tom Hall, Vice-President Houston Instrument, Austin, TX

l expect the majority of breakthroughs to occur in software rather than hardware. And they will be broadbased rather than specific. We haven't scratched the surface of providing users with software they need.

Josh Gregory, Sales Manager Metasoft Corp. Chandler, AZ

Anything you can do with the mainframe.

you'll be able to do with the PC: spreadsheets, memory. ###

> Don Roth, President Percom Data Corp. Dallas, TX

The cost of mass storage should come down. All computer costs will be coming down. I think you're going to see a slow refinement of the existing technology.

Bill Barrar, Vice-President Whitesmiths, Ltd. Concord, MA

We have canceled all future COMDEX shows and have shifted our focus to the PC retail marketplace. We feel that real success will come in finding and exploiting specialized niches rather than in the mass marketplace, gearing toward areas where we passed with the mass marketplace and the mass marketplace are shown and the mass marketplace.

John Rice, President Entre Annapolis, MD

The next big breakthrough is going to be in mass storage—those little laser disks that store hundreds of thousands of megabytes. The maturity of, or ability to use optical disks and laser disks, as opposed to hard disks, is the next major effect.

> Gary Betty, Director, Marketing and Sales Hayes Microcomputer Norcross, GA

Communications is the largest growth area, especially in local area networks and communications software modems. There are no major

breakthroughs, but there are continual advancements. On the marketing side, people need to change and react to computers, and vendors need to talk to consumers rather than simply look for applications for new or existing technology. 1985 should see some very aggressive marketing.

William Jennings, Owner Entre Portland, ME

Jim Stepahin, Manager Entre Charleston, SC

The biggest area of opportunity is in voice activation. Companies are coming out with keyboards that can recognize up to 100 words. Eventually, we'll be able to use microphones instead of



Edward Currie, President Lifeboat Assoc. New York, NY

 puters in the PC, PC-XT, and soon the AT classes. A lot of machines are now making their way into major corporations and smaller businesses. There is a much broader requirement for information. We've reached a threshold where machiness need to communicate with



Stephen Shapiro, Manager Businessland Rockville, MD

It will be a challenge to the industry (and I think Apple meets this challenge very well) to make their machines very user-friendly, fun, and not so complicated or intimidating.

Richard Rabins, President Alpha Software Corp. Burlington, MA

The most successful marketing efforts will be directed toward finding out what people want and need rather than coming up with the technology first.

Bill Jordan, Manager ComputerLand Orem, UT

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An Appraisal of GEM: Diamond or Rhinestone?

BY STEPHEN MANES It's a Macintosh! It's a

Jackintosh! No. It's GEM, running on your PC!

Ever since CP/M-86 lost out to DOS in the operating-system war, Digital Research has been hunting for a big new weapon GEM, the Graphics Environment Manager, is DR's entry in the hot new user-interface battle, which includes such forces as IBM's TonView and Microsoft's Windows Lused an IRM PC equipped with a Kamerman hard disk, an IBM Color Monitor, a Tecmar Graphics Master card, and a Microsoft Mouse for this first look at Version 1.0 of GEM's system software, GEM Desktop, and a prerelease edition of GEM Draw.

For now, GEM's strongest suit seems to be slick and fast graphics software routines that more or less emulate the Macintosh's much-praised Ouick-Draw program. Tving into these routines can offer real benefits to program developers, especially those working on those new machines that will recognize GEM's user interface as their standard

Mac-alike

GEM Desktop, is primarily a glitzy Macintosh-like visual shell for DOS. Occupying more than 110K of RAM, the program doesn't really add any canabilities or functions to DOS: no concurrency, no multi-tasking, and no windowing of or cutting and pasting between applications. Boot GEM Desktop, and you

get a black-on-white high-resolution screen that looks exactly like the one on the Macintosh. Menu options occupy the top of this "desk," and disk and trash icons appear down the right-

The mouse controls an onscreen arrow. As with the Macintosh, one button does everything:

if your rodent has more than one button, only the leftmost one will work. Just as in TopView, masochists can limp alone in GEM with just the keyboard: The arrow keys move the pointer, the Home key serves as the button, and the Shft and Ctrl keys provide all the Macintosh-and then some. Like the Mac, GEM's windowing capabilities only work at the operating system command level; once you enter an application, you can't access a directory of your current drive. You can get at GEM's alarm clock



GEM's strong suit is slick and fast graphics that emulate the Macintosh's Quick Draw

GEM runs from the DOS command processor and transmogrifies DOS commands into Mac-like icons and windows, A subdirectory becomes a "folder." an executable program becomes an "application" icon and other files are portrayed as "documents." GEM users must master the whole Macintosh repertoire of mouse stunts-pointing, pressing, dragging, clicking, doubleclicking, shift-clicking, and so on-and learn how each works with icons and windows.

Want to run a program? Move the pointer to its icon. double-click the mouse, and presto! Want to see what's in a subdirectory? Double-click a folder, and a contents window "zooms" onto the screen. Want to delete a file? Drag it to the trash. It's easy-at first.

Frustrations and More However, GEM generates

the same frustrations as the

tem, this accessing requires annoving disk-swapping for even the simplest tasks. With a hard disk. Desktop demands its own path, which can cause trouble with programs that insist upon other methods. GEM itself can use naths but only in certain narrowly defined ways that limit the paths' usefulness.

Once GEM gives control overto a DOS application, however, it tends to stay out of the way. I was able to run all of my favorites, including a memoryresident disk emulator, print spooler, and keyboard enhancer (loaded prior to GEM), without incident. When loaded after GEM, SideKick ran with the usual video glitches it produces with graphics-based programs.

Like Mac's Finder, GEM Deskton needs to access its own disk files. On a floppy-only sys-

However, since GEM takes over wherever you'd normally see a DOS prompt, it can play stupid tricks. Run a utility like CHKDSK, and the GEM screen wipes out DOS's message before you have a chance to read it. The only alternative is to select "Enter DOS commands" from the options menu. This choice loads COMMAND.COM and lets you work in DOS until you type EXIT.

Peccadilloes GEM crashed on my system

more than once. The program also insisted on lining up at the very left of the screen, even though every DOS application I ran was properly centered. GEM didn't bother restoring

DOS border colors after it stole (continued on page 54)

and Spotlight are not going to be Future Facets of GFM

and calculator from an applica-

tion like GEM Draw, but from a

standard DOS application,

these functions are unavailable

The Mac's handy notepad and

scrapbook, used to transfer data

between programs, are nowhere

to be found in GEM. PC users

accustomed to memory-resident

desktop programs like SideKick

impressed with GFM

Other products coming from GEM in the near future include: · GEM Draw: a graphics editor with a library of predesigned graphics that retails for \$149 (\$249 after August 31,1985)

· GEM WordChart: software for generating fancy text charts that retails at \$149 (available July, 1985).

· GEM Graph: a presentation package for producing a variety of charts in different graph styles that retails for \$199

· GEM Collection: an integrated software package that includes GEM Desktop, GEM Write (a word processing program developed for GEM by Lifetree Software Inc.), and GEM Paint that retails for \$199. In addition, GEM Deskton will also be marketed as a standalone product with a list price of \$49.95.



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PC UPDATE BY VIRGINIA DUDEK

NEW YORK - C compiler users will want to follow recent changes at Hicrosoft of Bellevue, Mash., and Lattice, Inc., of Glen Bilwn, Illinois, Lattice is the former state, and the state of the state of the former according to Lattice president Dave Schmitt, Microsoft has been planning to come out with its own C Compiler but wanted to get one to market before its own product was ready. Microsoft agreed to market the Lattice Microsoft has been with the sound to the state of the state of

Now, current users of the Microsoft Compiler can upgrade to Version 2.2 of the standard Lattice C Compiler for \$150. The upgrade includes a free copy of Lattice's C-SPRITS program debugger. Version 2.20 includes, among other features, a size includes, among other features, a size and an overall reduction in the size of the run-time library.

Microsoft is offering an update to Current users of Version 2.03 of the Lattice C Compiler (Formerly Microsoft's C Compiler) Users can send \$100 to Microsoft and obtain the new Microsoft C Compiler Version 3.0, among other features, Version 3.0 is designed to conform to the upcoming UMIX System V standard.

BatterBASIC version 1.1 has been released by Sumant Software Technology of Mellesley, Mass. The modular lanquage program now has Dos and BIOS ROM calls. chaining overlaye, DoS 2.x and 3.x subdirectory support and nextended memory feature. Summit has already sent a free documentation is awailable from Summit.

Business presentation graphics get a boost from Version 3.0 of Reychart, business of boost from Version 3.0 of Reychart, business of Calif. The program now allows on-screen editing of charts and graphs. Instead of having to replot, the cursor arrow can be having to replot, the cursor arrow can be other additions include scientific X-y plotting and high/low closings for atock quotations. SoftXey will provide Version 3.0

Some short takes inforDools, Inc. of Cupretino, Callf, announced release 3.04 of Unpertino, Callf, announced release 3.04 of years that backs up hard disks. Users can seen 314.65 piles shipping and handling to InforDools. The sonnel lock Systems, Plymouth Assistant, a Sicro-based personnel software package, is now available for the 180 KT, Octopers, NY, announced Multi-TuDE Release 2, 8 PC-050 operating enhancement system that one PC. Call Annex for a free update.

Be a contributor to PC Update. Write or call Virginia Dudek, PC Magazine, One Park Ave., NY, NY 10016 (212) 503-5265.

An Appraisal of GEM (continued from page 51)

them. It insisted on displaying hidden files. To top it off, you will still need more than a passing acquaintance with DOS to properly operate GEM. Double-click a program, for example, and you might get a request for its parameters.

GEM's batch-file installation procedure can be frustrating. Because there are no replaceable parameters, the procedure absolutely will not permit the program to run from a hard disk called anything other than drive C: This method also installs COMMAND.COM in a subdirectory of the Desktop disk, thereby forcing you to perform two extra disk swaps virtually

GEM with GEM Desktop and GEM Draw

Digital Research Inc. 60 Garden Ct., Box DRI Monterey. CA 93942 (408) 649-3896 Requires: 256K RAM, Graphics or Enhanced

Graphics or Enhanced Graphics card and color monitor (or Hercules card and monochrome monitor), mouse, two disk drives, DOS 2.x or Concurrent DOS 3.3 or later.

every time you choose the "Enter DOS commands" option.

Fast Draw No doubt about it, GEM is

speedy. It redraws high-resolution screens as fast as Quick-Draw does on the Mac. This makes GEM's element-based graphics program worth a look.

GEM Draw remembers each unit as it is drawn on screen and, in theory, allows separate manipulations of the image later—like Mac-Draw and Lisa Draw rather than like the freehand Mac-Paint systems.

Gem Draw provides a wide variety of automatic-alignment options and paper formats and allows the user to work with two windows at once. But it lacks MacPaint customizable patterns, brush mirrors, fat bits, and extensive text fonts. The review version's documentation was extremely sketchy: apparently, the program displays colors in the extended modes of the IBM Enhanced Graphics Adapter. Even without it, GEM Draw can produce hues on the proper plotter, camera, or printer. GEM's current list of supported hard-copy devices, however, currently includes only the Diablo C150, IBM/Epson printers, and the HP 7470A/7475A

plotters Unless Digital Research can get a whole mess of wonderful GEM applications rolling in a hurry, the program doesn't seem likely to make major inroads into the PC market, GEM looks like a Mac and offers a few extra gimmicks, but it leaves out any form of data transfer and many of the Mac's other useful features. In operation with DOS, it's an ugly. grafted-on third arm. But GEM just might be the perfect system for Jack Tramiel's cheap new Atari.



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COMMUNIQUES EDITED BY JAMES LANGDELL

You Deserve a Ctrl-Break Today



When McDonald's restaurants need computers, you'd think they would buy some \$12 KF at Mass from Apple and be true to the Sovietish clan. Seems microcomputers aren't on Ronald McDonald's Magbox Apple's anothines are to so low to handled fast food, but McDonald's didn't order a side of IBM PCs either. Franchise operators who want to use McDonald's registeristic you'ld have been applied to the propertiest profile of the McDonald's profile and the profile of the McDonald's profile and the McDonald's profil

McDonald's probably requires computers that powerful just to keep count of the billions and billions served.

PC-Compatible Chocolates

Judging from all the high-tech chocolate hardware in the PC munkeplace, you'd think someone had invented a new semi-conductor technology based on theodoronine (the active ingrediate multiple in the properties of the properties o

All four of these chocolate computer items are a welcome change from the typical molded novelty that tastes more like wax than candy. "The Chocolate Chip" is 1.9

"The Chocolate Chip" is 1.9 ounces of Belgian semisweet chocolate, set in a black box lined with red plush. This stylish tidbit, made by Chocolatek (4475 Mission Blvd., Sweet 211, San Diego, CA 92109, (619) 272-7720), is sold in stores at prices from \$6 to \$8.

One chocolate diskette is called "The Original Chocolate Byte" (priced at \$9.95) because it's molded to look as if one of its corners has already been nibbled. This 4.77-cunce square of milk checolate is wrapped in red foil and packaged in a hard plastic diskette case. The case, which can be used to carry real disks after the checolate is exhausted, is a popular part of this gift, according to its maker. The Chocolate Software Co. (1523) Ventura Bilvd., #1118. Sher-Ventura Bilvd., #1118.



man Oaks, CA 91403, (818) 986-4885).

Curiously, that company, which is a division of The Software Toolworks, got into the chocolate hardware business by accident. An artist molded a single chocolate disk to be portraved on the nackage of a Software Toolworks program Chocolate Bytes, a disk with over 100 chocolate recipes. To publicize the program, Toolworks molded a few more chocolate disks and sent them to dealers. who were more interested in selling chocolate disks than cookbook software, so the Toolworks put its mold back to

work.
Sweetware produces "Eat-Only Diskettes" (two 4-ounce disks for \$11.95 and a "Solid Chocolate Computer" with separate monitor and terminat (18 ounces for \$15.95). Both are made of milk chocolate, with no preemptive bites taken out of them. These can be ordered from Sweetware, \$16 Shelburne Road, South Burlington.

VT 05401, (802) 862-6939.
What will be the next trend in computer foods? Perhaps bubble-gum memories.

PC Guides and Dolls

Coleco's ill-fated Adam computers may be collecting eobwebs this summer, but the lives of that manufacturer's moresuccessful Cabbage Patch Kids can be brightened up with computers. If you have one of those homely faced orphans, it can join the ranks of the kiddic keyboarders attending Patch Pepe, a computer camp billed as the "School for Unique Kids."

After a term at Patch Prep, under the direction of Margaret Kingsley, your computer-literate "Patchie" will return toting a computer-generated diploma, a doll-sized Patch Prep T-shirt, and individual and class photos, posed next to a computer to a computer.

Its easy to send your kid to

camp. Just crate it up and ship it via UPS or purcel post to Patch Prep. 10 Corbin Circle, Branford, CT 06405. Enclose 529.95 for the first doll and \$24.95 for each additional stuffed sibling. Last year, the Cabbage Patch dolls cushioned Coleco against its losses from abandoning the Adam computer line. The 18 million dolls sold in 1984 accounted for more revenue than

million dolls sold in 1984 accounted for more revenue than 1983 sales from computers and videogames combined. IBM could have learned a marketing lesson from Coleco

marketing lesson from Coleco when it suspended the PCjr this spring. Big Blue should have cashed in with a line of dolls modeled on its PCjr per-

sonification, the tyke who played the Little Tramp's littler sidekick.

Since the PCjr is now an orphan. IBM's stuffed tots could inherit a market share of the Cabbage Patch mystique. And there's a natural aftermarket for accessories. PCjr owners can help IBM by dressing them up with tiny white shirts, blue

suits, and little black shoes.
—Robin Raskin
and James Langdell



Microchips Become Food for Thought

Researchers in molecular electronics at Camegie-Mellon University are trying to invent biachips—organic molecules that can function as electronic circuits in computers. While these scientists have a tough row to hoe before successfully growing a computer, an independent author claims to know the secrets of a more direct way

to raise organic computers. Computer Gardening Made Simple! is a pamphlet authored by Charlie "Chip" DeJardin II. who has a down-to-earth attitude about electronics. Each copy of the booklet includes a packet of computer seeds. They may look like integrated circuits, but the author explains how to sprout and replant them. With good soil, decent weather. diligent debugging, and a few months of patience, you can save thousands of dollars when you harvest a row of computers. pluck diskettes from a Southern Floppy Disc plant, or dig up a few modems, which grow underground like potatoes.

Delardin claims that computers you raise yourself are more user friendly than "those grown in large factories, where the plants do not get very much attention"

The seeds and 32-page illustrated book are available for \$2.99 and 75 cents postage from Zick Productions, P.O. Box 13096, Gainesville, FL 32604





Burn Baby Burn, Says PCjr Software Maker

"We're just sitting here trying to put our PCjrs in a pile and burn them. And the damned things don't burn. That's the only thing IBM did right with the machine—they made it flameproof."

—William H. Bowman, chairman of Spinnaker Saftware Carp., quated in Wall Street Journal, March 21, 1985

You Know My Name, Look Up My Number

In the electronics business it's hard to find product and company names that are still up for grabs. This problem faced Steve Wozniak recently when he wanted to name his post-Apple venture MBF—short for My Best Friend. But that name turned out to be claimed already, so The Wozhad to retter to Cloud 9, a name now reduced to CL 9.

In light of the name shortage, Ashton-Tate seemed to be spendthrift in a recent ad for Framewark that depicted a man struggling to reach over a desk piled high with software packages. A score of the boxes in this scene were labeled with names never seen before in the computer business—names like Textware, Unitart, NEWware, Formula Ware, X-57 Ware, Nexo, and Nowave.

How did Ashton-Tate find so many unused names for its fictional wares? The company had to do a legal search on numerous names, just as it would for an actual Ashton-Tate software product. "It was a considerably long process," said Maralee Sanserino, Ashton-Tate's director of advertising, when we cold tacted her at the Ashton-Tate of fices in Culver City. Calif.

Sanserino explained that the most cryptic names in the ad-MRP 85, Deville, and CAP-707 among them—were derived from the names of typesetting fonts. The number 7 also seemed to be a key element in making safe names—hence, OUU-77 and 777Ware. Maybe uncopyrighted 7's are so plentiful because that digit has become too old-fashioned in the eight lies.

Drive, He Squeaked Car & Driver is one of our fa-

vorite magazines, so we were thrilled to see a big name in the automobile business bring its racing spirit into the PC market. The Torrington Company, a leading manufacturer of automotive bearings and universal joints for steering systems, used these road-wise words to describe its new computer mouse:

"An independent suspension system on its X-Y drive wheels provides low-drag, skipfree, and smooth gliding performance on a variety of desktop surfaces at any angle.

"More traction between the drive wheels and operating surface greatly improves our mouse's control and positioning of the cursor."

Torrington says its mouse has

survived tests running "three times the distance of its 200mile life," thanks to this rodent's "rugged construction, urethane drive wheels, Teflon glide pads, plus a plastic-shielded drive mechanism."

The Torrington mouse is available in four modes, offering users the options to choose between two or three buttons and serial or quadrature output. If you'd like to join the mouse race and burn some urethane on your desktop, contact The Torrington Company, 59 Field St., Torrington, CT 06790, (203)



DOWN TIME BY WINN L. ROSCH

Datacopy 700 Gives PCs A Photographic Memory

Back in the days when I freelanced for the local newspaper, I had the honor of writing the stories no one on the staff wanted. I soon learned the true worth of a picture—not just a thousand words—a full \$20 bucks, paid on publication. By dressing up each of the tales I sold to the newspaper with enough images.

kept chained near my front door. The incentive was enough to transform me from journalist into photojournalist; enough that I, with a cleverness only surpassed by laziness, develoned my own image bank. With my surplus of photos, I could quickly select the right picture to emphasize a particular point-and incidentally fill the glaring hole in my text and budget-without jumping in my waders and slogging through some swamp. (I remain one of the few men who has ever gotten a picture of a bog-bound skunk cabbage published in a newspaper.)

Shadow Dancing

Since my newspaper days, the lesson that I learned has the lesson that I learned has the lesson that I learned has I've found that what works for gonzo journalism works just assuell for related forms, like business reports. The personal computer proves this point, with colorful machine-drawn graphies and charts gracing those otherwise gray-flannel sleeping potions.

Despite computerization, however, rarely do meaning-packed images like photographs and line drawings grace business letters, reports, and other diatribes today. The reason is not their lack of value or purpose. The worth of a rmg shot from a personnel file, a photo of

real estate for sale, or the floorplan of a bank far outweighs the power of the written description alone.

I can conjure up a few reasons why such artistry is absent from business writings—the inconvenience of swabbing your stationery with mucilage to hold a daguerreotype in place, the problems involved in building an image bank, and the labor required to manually file everything and process the pictures when needed would be enough to dissuade most business-people from becoming image collectors.

Banking on Images

Computerization is coming to the lead chariot of the invasion, the Datacopy 700. An image-capturing machine that digitizes graphics and photos into PC-compatible form, this machine promises to make your personal or corporate image bank more a

boon than a bother. With the Datacopy 700, turning your favorite image into digital form is about as easy as making a Xerox copy. Simply lay out your line drawing, photograph, or even text material on the glass-top of the PC-size machine. Select the CAPTURE command from Datacopy's WIPS software, and in less than a minute, all the inky detail has been copied into a collection of bytes capable of reproducing the original with a resolution to 200 dpi. Resolution of 300 dpi. to match the latest laser printers. is on the drawing board.

You can file away the finished digitized image on your hard disk (the Datacopy system requires you use an XT or AT), copy it like any other data file, and even view a rough copy on

e your screen using a Hercules
Graphics Adapter. A special
zoom mode in the WIPS software lets you fill your whole
s screen with a one-inch-square
image of the original in intricate

detail but in an odd aspect ratio. When you want to spice up your otherwise down-and-dirty reports, the Datacopy software allows you to stick the image—reduced or enlarged to fit, if you please—in the appropriate place in your laser-printed document. If you have about an hour to spare, you can also get a blotchy replication on your Epono printer or on one of the few other dot matrix machines the software.

supports. Different Looks

Line drawings look like nearexact copies (with no tonal variations); photos, however, have an odd cast. Even though the photo resolution is about twice that claimed of newspaper halftones, the printed images look different because dot matrix printing and half-tone engraving inevitably yield disparate results.

Additionally, color art can be a problem because the Datacopy is overly sensitive to red and doesn't much care about blue. It's orthochromatic rather than ananchromatic, Nevertheless, digitized photos are detailed and decipherable. You could quickly identify the man or beast pictured in an image printed from a Datacopy-stored file. The technology is still young

and faces a few obstacles. A little math will tell you that 200 dpi spread over an 8½-by 11inch sheet is about 3.25 million points. Multiply that by the number of gray levels you want, error-checking if you're insecure, and you've got a pretty



Despite the benefit of data compression, each of my fullsize Datacopy photo images required half a million bytes (or more) of disk space. Even the biggest of Winchesters will quickly run out of room—if you

store nothing but full-size photos. A more reasonable image, say about wallet-size for incorporating in personnel files, requires commensurately smaller storage; line drawings require even less.

Big images also take big processing power, straining the limits of the bumble PC. Even with a full 640K RAM, your computer will shuffle temporary files on and off disk. Unless you are placidly waiting for retrement day, you'll want to put an AT to work, which cuts the three minutes that the Datacopy requires to pull a full-size image off disk in half, as well as giving image-processing speed an even bigger boost.

The future for the Datacopy 700 and its technological litter-mates will brighten as more and more powerful personal computers crowd into the market along with new disk drives bulging with megabytes and, of course, opical memory systems. Once this powerful hardwood with the course of the course of the course of the course of the course, opical memory systems. Once this powerful hardwood would be hard to find applications for electronic image banks. I could even put my newsworthy photo collection on-line.

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15-18
The National Computer Conference sponsored by AFIPS, Association for Computing Machinery, Data Processing Management Assoc., IEEE Computer Society, and the Society for Computer Stimulation. To be held at McComputer Hate in Chicago, Ill. The theme for the Conference is "Technology by Expanding Horizons." For Information and Inf

AUGUST

Future Computing'a Graphtes Forum and Seminar To be held as the Hyatt Regency Embarcadero in San Francisco, Calif. Overview and forecast of the personal computer graphics marketplace. Contact: Future Computing, Inc., 8111 LBJ Frwy., Dallas, TX 75251, (214) 437-2400.

SEPTEMBER

UNIX EXPO. To be held at the New York Hilton and Sheraton Centre Hotels in New York City. A UNIX operating system exposition and conference for manufacturers, OEMs, VARs. ISOs, and endsers. Spomored by National Expositions Co., Inc., 14 W. 40th St., New York, NY 10018, (212) 391-9111.

OCTOBER 15-18

COMDEX/Europe. To be held at the RAI Congress and Exhibition Centre, Amsterdam, The Netherlands, Will feature hardware, software, peripherals, and other related items. Presented by The Interface. Group, 300 First Ave., Needham, MA 02194, (617) 449-6600. PEOPLE IN THE NEWS

ISAAC ASIMOV Separates Hard Fact from Sci-Fi

Some thoughts on today's technology by the master writer

of tomorrow's science.

BY CHARLES BERMANT

NEW YORK—Isaac Asimov is talking baseball. When a ball is hit, he says, an outfielder automatically calculates the force of impact, the expected trajectory, and the effect of wind and weather conditions. Given this information, he will mentally compute exactly where the ball will be at a precise time, meeting it effortlessly with his outstretched allow.

ing it effortlessly with his outstretched glove.
"We are so used to seeing them do this," says Asimov, "when they miss we boo."

This example, says Asimov, illustrates both what a computer can and cannot do. It can analyze numbers but it cannot make judgments. And once the power of computers is recognized by the public at large, their contributions will be taken as much for granted as the fate of a fly ball.

On this particular occasion, Asimov is helping Brother International inaugurate its Twin-riter printers. It is a break-through product that uses daisy wheel and dot matrix technology as well as a combination of the two. Asimov was requested to give a short address about computers and humanity by a PR firm. It's a straight gig—don't expect to see him hawking to a short address about computers and humanity by a PR firm. It's a straight gig—don't expect to see him hawking the him to be a simple printer of the product of the prod

pithy, and full of common

sense. He is playing the role of the modern wise man, and his remarks are seemingly off the top of his head. His green shirt, bolo tie, and muttonchop sideburns show that he has as many iconoclastic ideas about fashion as he does about science.

He manages to imply that Brother has made a gaint leap for markind with this day's product announcement, finishing his speech by saying, "We are here to celebrate another in the ongoing victories of computerism so the human species can become totally creative and the world become totally creative and the world become a much better world than anyone would ever imagine."

The Big Four

According to Asimov, computers represent mankind's fourth communication revolution. Unlike the first threespeech, writing, and printing—computer capabilities augment rather than depend upon the capabilities of the human memory.

"The computer revolution is

the most fundamental revolution of all," says Asimov, "It's more than a refinement of earlier skills and offers something that is not human in nature. The computer—and the printer—is the nonhuman force that reinforces the human memory."

After only 40 years of use,

After only 40 years of use, Asimov doesn't think modern civilization can get along without computers. And, he believes in 40 years more, computer tillsteracy will have been eliminated with little ado: "It is mostly adults that are resisting," he says. "Children are more open, they will learn anything you ask them to. All we need is a change in generations."



Handy Dandy

"I don't waste time on nonesscentials like thinking," he says. After the expected audience reaction he adds, "That line always gets a laugh, but so help me it's true." Of his unusual writing habits he says. "I write efficiently and quickly. My first drafts aren't Shakespeare, but they're usually pretty good. When I started, I thought that's how everybody wrete. By the time I found out that it wasn't, it was too late."

If his thoughts are pointed toward the next century and beyond, his choice of PC, a Radio Shack Model 2, seems to be neanderthal selection. However, in science as well as in the Bible, for everything there is a reason. The computer was a freeble, given to him by Tandy more than 4 years ago, and he's gotten used to it. "It's so difficult for me to

learn to do anything with my hands," he says. "The fact that I learned how to use the Radio Shack is to me a miracle. Now that I've learned to use it, I've got to stick with it.
"The only thing I can do well with my hands is women."

hotograph by Them O'Conne

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PARITY CHECK BY STEPHEN MANES

Pushing Picture-Perfect Programs: Smash That Icon!

What does Webster's dictionary define as "an object of uncritical devotion," synonymous with "idol"? You guessed it: icon

I just spent a couple of days shuffling GEM's little idols around the screen, and it was enough to turn me into an iconoclast. Digital Research isn't to blame: The tiny pictures don't work any better on the Macintosh. It's time to nip these cute little gremlins in the bud before the next generation of computer users ends up a bunch of illiterate morons with electromechanical "pointing devices" genetically implanted in their palms.

Xcrox Means Computer? As near as I can figure out, icon-based systems, as we know them, came from Xerox's Palo Alto Research Center (PARC), that company's Silicon Valley think tank. This fact alone should give you pause. How often do you associate the word Xerox with the word computer? Right: when the repairman fixing the office copier mutters that these new ones are "computer controlled, damn

The PARC folks proselytized with many of the cute tricks the Macintosh team later appropriated: multiple fonts, fancy graphics, the mouse-and icons. The term was playfully lifted from the branch of philosophy known as semiotics, a funfilled vocation or calling devoted primarily to studying the meanings of signs, symbols, and language, and explaining them in utterly incomprehensi-

ble prose. If a picture is worth a thousand words, so the icon theory goes, why not reduce the user's interaction with a computer sys-

tem to a simple system of pointine at symbols? Want to use a floppy disk? Point to its picture instead of typing "floppy disk." Want to read a document? Point to a cute little piece of paper.

Different Disks

But how do you differentiate your thirteenth disk, which contains business proposals, from your fifth, which contains rather different sexual ones? A good program designer could probably come up with a good set of the file icon from its little win-

Xerox's original icon-based systems had room for this informative text. Its screens showed at least a full page of text along with the icons; some even showed two full pages. A PC or Mac should be so well-endowed.

Mystical Animation

'Icons work intuitively.'" say icon-worshippers high on Xerox toner. "Say you want to copy a file from one disk to another. Why, all you do is drag

If a picture is worth a thousand words, so the icon theory goes, why not reduce the user's interaction with computers to a simple system of pointing at symbols?

sub-icons: a dollar sign for one and a heart or some other organ for the other. But sooner or later, you're going to run out of

Unless, that is, you use some fairly common ones that we've used down through the ages to simplify complex situations: the alphabet. You could call one disk BUSINESS.13 instead of coating it with 13 dollar signs, and you could forego 5 hearts in favor of LOVE.5. Which is precisely what you do on a Mac. Since icons can signify only gross differences, every single symbol, right down to the "trash bin", also gets a plain-English label-just like every PC-DOS file.

So why not simply dispense with icons and gain some more screen space to display additional alphanumeric info? Well, dow over to the little disk icon, and abracadabra!"

Intuitive? Doesn't intuition tell you that that's how you move (not copy) a file from one place to another? Not on your Mac! Once the copy's made, the original file icon magically jumps back to where it started.

Icons of Motion

Even the Apple folks aren't too hot about icons for verbs. If they were truly serious, they'd hire the people who designed the Ghostbusters logo to come up with cute little pictures for their menus: a little pair of scissors for "cut." a glue pot for "paste," and a garbage man for "empty trash." But no. In pull-down menus. Apple uses text. In

most cases, text can convey

more information more suc-



cinctly than icons possibly can Icons make sense only if they have single unambigous meanings-and thus don't require labels. Macpaint's icons, for example, do save screen space: the "paint can" does its stuff the same way every time. But an icon with a label is like an editorial cartoon that includes the word Reagan on its caricature of the chief executive

Mickeying Around

The Mac and GEM interfaces do let you switch from pictorial icons to DOS-like one-line text descriptions, complete with file size and date. The only problem is that to do something simple like copying or trashing a file. you have to switch back to the less useful icon setup.

What's particularly irritating about these displays is how hard they make it to find a particular file. Even in text mode, it's no picnic to wade through a 100file subdirectory, since there's no easy way to tell the computer, "Show me all the files beginning with M." And for some reason, there's a new cabal (TonView's in it, too) that opposes the truly intuitive method of scrolling a window; holding down the appropriate arrow key and waiting a sec. Instead, you have to mickey around with scroll bars and scroll buttons and sliders and window size boxes and phase shifters and time warpers to unearth what you're looking for.

I'm not against menus, as long as they can be turned off. I'm certainly not against pointing, especially if you can do it with the arrow keys. I'm not against a totally redesigned DOS shell either. Just leave those damned icons in the churches where they belong.



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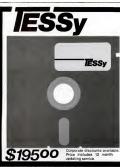
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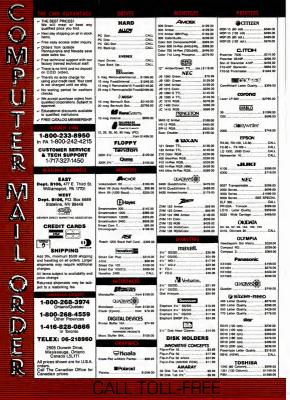
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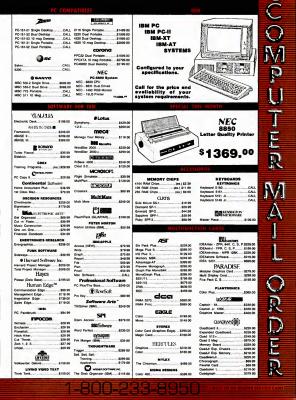
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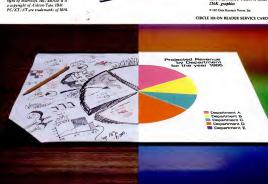


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PCjr Revisited

IBM may have given up on the PC's little brother, but the machine's owners remained loyal and responded in droves to our request for information on how the Junior serves their needs.

Back in mid-March, I asked you why you had gone out over Christmas and bought a PC/r. After reading more than 300 letters, I thin have a clue. The first big message is how deeply you care about PC/r. Many of you also asked why Ziff-Davis cancelled PC/r. magazine. The reason, as you might guess, was economic.

It's reasonable to expect that 10 to 15 percent of the owners of a personal computer might subscribe to a publication about it. Junior's mittal sales were so slow that we couldn't build a sufficiently large subscribe base to justify the magazine's existence to advertisers. Now there are perhaps 300,000 PC/pr. extant, with another 50,000 in the pipeline. But the numbers to support a magazine still aren't attractive, especially in light of PC/pr. owners is that the static numbers don't encourage coverage in existing magazines, cities.

The good news is that the PCjr is still "IBM-compatible." A great deal of the software PC covers has at least a fighting chance of working on a PCjr. We make an attempt to determine if products we review are PCjr-compatible, but the day of new hardware and software specifically for the Junior is over. Have you been thinking about a memory sidecar or a new disk drive? Buy it now, because it won't be there tomorrow.

A Great Article

My analysis of your letters was going to be a great feature article. I was planning on dropping in on the people at IBM

with my huge stack of letters. I was going to share some insights with them over your applications. They might have learned, at long last, how to market the little turkey. Don't think for a minute, though, that I was going to be PC/jr's sav-



Bill Machrone

ior. You were

One of the strongest threads that ran through your letters was that you're doing many of the same things with your PC/F at home that you do at work. Your boss should have bought the damn thing for you. He's getting the direct benefit through your extended workday. Now before Jget a banch of letters from union organizers, let me point of that you're the properties of the

Which is not to say that you don't know how to let your hair down. Nearly

everyone with a Junior knows how to have fun with it. None of you was ashamed to mention the games you enjoy. Not surprisingly, Flight Simulator was right at the top of the list, followed by King's Quest.

You also recognize the educational value of having a computer at home, both for your kids and yourselves. Your letters, though, were evenly split on whether or not the existing educational software was up to snuff.

The other major theme that emerged is that you feel good about having gotten 90 percent of the PC's function at perhaps 60 percent of the price. "I saved \$1,000" was second only to "You asked for it" as a recurrent phrase. You shopped smart, and you're proud of it.

Your Turn

You took the time to write, and I read all of your letters. Here are some excerpts that express common feelings well:

I love small computers, and IBM finally built the right one for me. —Wesley Steiner

This is my fifth personal computer. I would love to have a PC or even an XT, but my wife would string me up. Where else are you gonns get MS-DOS, 128K, 16 bits, RGB monitor, serial goodies for less than \$1,000' My boss is impressed, my coworkers wonder how I get so much done, and I don't work nearly as hard as they do. This is the first machine I have ever used that



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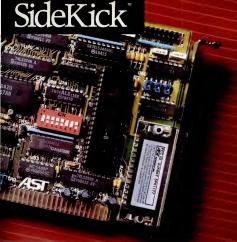
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-Steve Sims

I bought about \$5,000 worth of software for my company and a PCjr for my-

self (with my own money, of course). I am very impressed with my Junior. The graphics are better than any I have used, and the speed of execution is superb. -Pat Eldrige

Although Junior-specific software deserves some mention, all I need from your magazine is for the reviews to state whether it works on the Junior and the configuration required. Although I was sorry to see the Junior magazines fold, I did not find them useful. They all assumed that owners were incapable of learning anything complicated.

-Jerry Roger

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about it.

The addition of 384K and a second drive has made my Junior work like a charm. It runs WordStar and dBASE III from the RAMdisk. The PC switch on the Rapport box ends the PC video-compatibility problems. Would I buy a Junior again? I don't know. However you look

at it. I saved \$1,000.

-Mark Perloe

I am in the Boston Computer Society's PCir Group. The typical setup has a Tecmar ir Captain board with the 64K chips removed and replaced with 256K chips for a total addressable memory of 640K. -Chris O'Connor

I raised a family and recently went back to college to learn about computers. Leat booked and talked my bushand into buying us one. We love our Junior. I don't get to use it evenings and weekends any more. My husband did our taxes on it. Our 18-year-old does her homework on it and carries the disk to school. Our son wasn't pleased with his SAT score, so we bought an SAT package, and he studied for a week. His score improved by 150 points. Our 13 year-old daughter does reports for school with Writing Assistant and types in programs we find in magazines and books. IBM Product Center classes are quite expensive, so we learn by trial and error.

-The Robert Johnson family

If it does nothing else for me, it has made a job that after 7 years was becoming boring and not fun, fun again.

-Paul S. Dickinson I hope you aren't sorry you asked about the PCjr. It was fun telling you

—Thomas Catanzarom



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Letters to PC

Goodbyc to .BAK Files In Letters to PC. Alice L. Ullrich re-

quested information about saving wordstar files on floppy disks without creating .BAK copies ("Getting Rid of .BAK Files," PC, Volume 4 Number 7). George Beinhorn's solution was to give all working files the same name but with different extensions (for instance, product.txt, product.let, and so on), so that just one. BAK file is created for the entire set of file.

While his solution does create fewer BAK files, I have found a different solution that is just as easy, provides greater feetbillijk in file maning, and creates no BAK files at all. Simply extablish as the file and, upon starting WordSun, copy the document (using Ctrl-Q) to that RAMdisk. Edit the document from the RAMdisk, and when you're done, copy the file back to the floppy. Using the copy command to store the file on the voyer files and way wou're those.

Establishing a RAMdisk is relatively easy, but WordStar users with limited RAM (96K or less) will need to expand their system. The current affordability of RAM chips may help to justify the cost of expansion.

Marcus C. Hermansen, M.D. Lexington, Kentucky

Maintaining Your Disk Drive

The cover stories on maintaining your PC were excellent ("Whatever Ails Your PC," PC, Volume 4 Number 6). I only wish they had been published earlier, since the information and tips they contain will save me a lot of time on my next repair engagement. But you still have another chance with the PC AT.

have another chance with the PC AT.

As a consultant, I am constantly confronted with technical maintenance problems that I can usually diagnose and fix
myself. I also set up and install systems
by mixing and matching different boards

to my clients' specifications. Practical experience has made me aware of some problems your articles didn't mention;

discussing them may help other readers. The problems pertain to the article, "Maintain Your Sanity: Maintain Your



Disk Drives," which says that when installing two disk drives, the terminator chip on drive B:—usually the drive on the right side—must be removed. The a ticle fails to mention that the jumper packs contained on the top of some mannufacturers' drives must be properly set. The correct setting is such that only the third pin from the right on both drives

The second problem, which sometimes occurs with hird-party hard disks, is that the PC boots up into cassette BAfor on a apparent reason. If a warm boot (Ctrl-Alt-Del) does not work, try shutting off the PC for a minute or two and then restarting it. This has worked for me a number of times under many different circumstances.

I have learned so much from PC Magazine. Keep up the high level of technical information, but don't give up on the beginners.

Morris W. Stemp, CPA Jamaica Estates, New York

A Solar Solution

should be jumpered.

I'd like to respond to the letter from Robert E. Potter in Letters to PC ("Solar Energy Software," PC, Volume 4 Number 4). He was looking for a solar energy design program.

Cyril Carter of Trent University and I have written a book, Principles of Passive Solar Building Design (Pergamon Press, New York), to be released later this year.

The book covers modeling solar programs with the IBM PC. The programs in the book, ZONESTEAD, WALLSPEC, NETSPEC, and SUNSPEC can be used as analytical tools in examining parameters pertinent to solar heat gain, heat loss, and insulation values. Physical mass and air infiltration are also addressed.

For more information, readers can contact me at R.R. 3, Sherbrooke St. W., Peterborough, Ontario, K9J 6X4.

Johan de Villiers Peterborough, Ontario

Is This Offer for Real?

I enjoyed reading M. David Stone's article in PC News, and like him I felt that the offer from Business Computer Network (BCN) was too good to be true ("Getting On-line at the Database Super-

market," PC, Volume 4 Number 5). I called the telephone number listed in the article to ask for more information about the modem, the deal, and the company. I talked to a very pleasant woman who said that she could not send me anything for some time because the company was splitting up: Some of it was going to San Antonio, Texas, and some of it was going to Cardiff By The Sea, California. This meant that she was going to be out of a job because the office, located in Riverton, Wyoming, would not exist in another few days. She concluded by saying that it may be several weeks before I heard anything in writing, but to go ahead and send the money

Maybe I'm being suspicious, and maybe BCN is a respectable company, but frankly, if a phone call ever sounded like a con, this one did. Can you offer me some sort of assurance that if I send my \$200 to this company, all will go as Stone's article describes? I don't want to

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LETTERS

pass up the offer if it is indeed legitimate. But if the company is breaking up and moving all over the country, how stable can that offer be?

Harry Polgar Downey, California

M. David Stone replies:

We are aware that BCN is currently reorganising and have been assured that this will not affect its operations. Of course, we are in no position to guarantee anything, but we have no reason to suspect that BCN is anything other than legitimate. We have gotten at least one favorable comment about BCN on PC's Interactive Reader System bulletin board and know off no negative experiences to date.

Realla's Response

In his column, "It's Odds and Ends Time" (P.C. Volume 4 Number 8), Peter Norton had one complaint about the Relais compiler. He didn't like our copy protection. Similar reactions from other clients prompeted us to implement a new method. In Vernion 1.20, the user cam ran Realia COBOL on a compatible hard disk without inserting a floppy. When we started shipping the new version in March, all licensed clients received 1.20 at no charge.

Marc Sokol Realia, Inc. Chicago, Illinois

Reader's Predictions
I am a new PC user. I use my IBM PC-

XT at work, so I spend all my spare time reading issues of PC Magazine. At times I feel I learn more at home with your magazine than I do at work with the software manuals. I have two thoughts I'd like to share with your readers.

First, I read the articles on the future of microcomputing ("Looking Ahead: Key Forces That Will Shape the World of Computing," and "Oher Voices, Other Futures," PC, Volume 4 Number 1) with great interest. It will be even more fascinating to read the January issues for the next 10 years to see how many of the predicted changes will happen.

Let me add my support to Werner Frank's predictions. I almost fell out of my chair when I read J.F. Coates's rebut-

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LETTERS

tal to Frank. He says "... who can imagine a word-processed love letter?" Well, just last week I signed up for MCI Mail, and the first thing I did with my word processor was write and send a long-overdue love letter to my wife.

My second thought involves the terminology gap in the computer field. Historically, the terms that become jargon in any field are catchy, concise, and de-



scriptive, and I'd like to contribute one. It's contissing that both 5½- and 3½- and 6½- and 6

Thanks for PC's contribution to this exciting new part of my life.

Dan Rosselle Atlanta, Georgia

Helpful Tips from User-to-User

The User-to-User suggestion from John Lawson in "Easy Printer Control" is one of the most useful tools I've seen recently (PC, Volume 4 Number 7). This is a very practical technique for controlling printer variables. I now use it to set margins and pitch for listing programs. Let's see more little gens like this.

Terry F. Pettijohn Marion, Ohio

The PC Goes Bowling

PC MAGAZINE • JUNE 11, 1985

I am a secretary for a bowling league and I need software to manage and keep bowling scores. Does PC Magazine have any suggestions for such software? John Beal

Yukon, Oklahoma

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Here's one for starters. Ensign Software has a software package called The Bowling League Statistics Manager. The company's address is 2312 N. Cole Rd.. Suite E, Boise, ID 83704, (208) 378-8086.-Ed.

PC Fan

Though I think that every issue of PC contains useful information and programs, I find the Programming, User-to-User, and PC Tutor sections to be the most valuable. I also enjoy the in-depth studies of applications and equipment.

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You're doing a great job educating us. Marvin A. Hodges Miami, Florida

Servicing Your PC

Wendy McKibbin's article, "Taking Out a Contract on Your PC" provides an excellent overview of the broad range of IBM PC maintenance services (PC, Volume 4 Number 6). However, there are some errors in the Control Data portion of the third-party maintenance service vendor listings

In the table used to compare third-party maintenance vendors. Control Data's correct pricing should be: \$888 for onsite, \$708 for courier exchange carry-in, and \$528 for ship-in exchange.

Currently, Control Data provides 24hour IBM PC maintenance services mostly for businesses in 80 metropolitan areas. Duane Andrews

Control Data

Minneapolis, Minnesota

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Gang of Fourteen: Disk Types for the AT

The PC AT has predefined support for 14 varieties of hard disks, ranging in capacity from a modest 10 megabytes to a monstrous 112. Here's a closer look at the whole crop.

wo issues ago I discussed putting a 32-megabyte hard disk from Interface, Inc., in my PC AT (see "Complementary Comments," PC, Volume 4 Number 10). Interface, of Canoga Park, California, and other suppliers in the AT add-on game can also sell you other sizes of disks, including a 52-megabyte disk that I tried. But the 32megabyte disk is the most important one to consider, and in my next few columns I'll talk about the "32-megabyte barrier" and a number of interesting related topics. For now, however, I plan to classify the hard disks available for AT according to the way they're formatted. One of the AT's nice characteristics is

One of the A1's nuce characteristics is at its built-in BloS predefines and pre-supports over a dozen different types of hard disks which makes it relatively easy to plug in new disks. Although IBM has of ar offered only a 20-megabyte disk for it, the AT is prepared to accommode hard disks a small as I Onegabytes that the same small as I Onegabytes disk controlled to the AT without any special hardware disk controller board or software device driver.

The Four Dimensions

These 14 disk types vary in a number of ways. Of significance to computer users are what I call the four dimensions of disk storage. Any amount of data we put on a disk is shoe-homed into a fixed-size storage unit called a sector. The number of bytes per sector is one of the four dimensions of disk storage. The other three dimensions are the number of sectors in a

full circle (or track) around the disk, the number of disk sides being used (a floppy disk uses one or two sides, while a hard disk with multiple platters uses more), and finally, the number of concentric circles (called cylinders) used on the whole



Peter Norto

disk. The raw capacity of a disk can be calculated simply by multiplying the four dimensions: the number of bytes per sector, by the sectors per (one-sided) track, by the number of sides (that is, the number of one-sided tracks per cylinder), by the number of cylinders to the whole disk.

Two of these dimensions are the same for all 14 of the AT's predefined hard disks. They all have 512 (or ½K) bytes per sector and 17 sectors per track—or 8½K storage for each side and cylinder. The other two dimensions—the number of sides and the number of cylinders—vary from disk to disk.

A Feast of Sizes

From a technical hardware point of view, it's worth noting that several of the 14 different predefined disk types for the AT have the same storage capacity. For example, there are 4 types that have the same basic 20-megabyte size-the four differ in their dimensions, but each totals out to 20 megabytes of storage. Similarly, 3 other disk types all have a 30megabyte capacity. So, 7 of the 14 distinct AT hard disk types provide only two different storage capacities. Each of the other 7 types of hard disks has a unique capacity, so you can choose from a total of 9 different sizes among the 14 disk types (see Table 1). The different types of AT hard disks

are identified by type numbers. You tell the AT's setup program (which comes with its diagnostic diskette) which disk types are installed, and the setup program stores the information in the AT's promanent, battery-powered memory. The AT's BIOS program discovers the disk type by reading this configuration information when you turn on the machine.

Disk type 2 is the AT's "standard".

20-megabyte disk, but any of the others can be installed just as easily. Disk type 1 is the only one of the 14 that is smaller than the AT's normal 20-megabyte size, its dimensions and capacity are identical to those of the disks used in the PC-XT. Type 9 is the 112-megabyte monster. Six of the 14 types break the 32-megabyte barrier, while the other eight fall within the 32-megabyte limit.

As you can see in Table 1, some of the

Dumb.



Memory full.

Lotus 1-2-3" allocates memory to empty cells, robbing users of valuable capacity.

Lotus 1-2-3 claims a spreadsheet capacity of 256 columns by 2048 rows. Unfortunately, its actual capacity often turns out to be much less, because memory is wasted on empty cells.

ory is wasted on empty cells.

That's the case in the screen on the left,* where all unused cells between column R(18) and row 2048

are needlessly allocated while trying to enter only one number, filling memory completely. The Smart Spreadsheet.

on the other hand, has a unique space-saving feature called "sparse matrix," which prevents such a calamity from occurring. That's because Smart allocates space for only those cells which are filled,

not those that are empty. And Smart's "virtual memory" design takes its capacity one step further. It means that the size of a spreadsheet is not limited by a computer's RAM (as it is with Lotus 12-3), but by disk space alone. It's like having

thousands of additional cells

of memory on reserve.
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of the reason why more and more corporate users are buying it. It's also fully relational, allowing for each financial

It's also fully relational, allowing for easy financial consolidations; includes an extensive business graphics package; and is part of a fully integrated system that works automatically and effortlessly with The Smart

Word Processor and The Smart Data Manager.

Sodon't shortchange yourself on a spreadsheet program that eats up memory like there's no tomorrow. Get Smart instead. And if you already own Lotus 1-2-3, keep in mind that Smart will translate all your files and formulas. Smart Software, from Innovative Software, is currently available for the IBM PC, PC/XT, PC/AT, and compatibles. For more information, please call 800-GET-SMART. (In

Kansas, call 913-383-1089).

Smart Software
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disk types have an odd number of sides. I Hard disk drives can have any number of disk platters in them, and there will always be an even number of sides-two for each platter. But some disk designs

reserve one side of one platter for control purposes. For this reason, 6 of the 14 AT disk types have an odd number of data

Nearly any kind of disk, no matter

how weird, can be used with any PC, including the AT. We aren't limited to the 14 types in Table 1, but these are the ones that can be installed on the AT without any special hardware or software support.

Bending the Boundaries

The kind of disks that the PC usesboth floppies and fixed hard disks-are soft-sectored rather than hard-sectored. This means that, within some fairly tight constraints, the dimensions of the disk can be varied. Obviously we can't add sides to a disk (nobody's going to suddenly discover that a floppy disk has a long-lost third side), and we'd be fools to use fewer sides than are available. Likewise, the number of concentric circles (which we call cylinders when we're talking about hard disks, and tracks when we're talking about floppies) on a disk is pretty much set by the disk drive's hardware characteristics. The most flexible dimensions of a disk are the first two: the number of bytes per sector and the numher of sectors per track.

There is a finite amount of information that can be crammed into a circular track on a disk, and that sets an upper limit to the size and number of sectors that are recorded on a track. The limit isn't cast in stone, but the more information we try to squeeze into one track, the higher the error rate. The proper disk dimensions al-



| Table 1: The 14 AT Hard Disks | | | |
|-------------------------------|-------|-----------|----------------------|
| Type number | Sides | Cylinders | Approx. cap in Mb |
| 1 | 4 | 305 | 10 |
| 2 | 4 | 615 | 20 |
| 3 | 6 | 615 | 30 |
| 4 | 8 | 940 | 62 |
| 5 | 6 | 940 | 46 |
| 6 | 4 | 615 | 20 |
| 7 | 8 | 462 | 30 |
| 8 | 5 | 733 | 30 |
| 9 | 15 | 900 | 112 |
| 10 | 3 | 820 | 20 |
| 11 | 5 | 855 | 35 |
| 12 | 7 | 855 | 49 |
| 13 | 8 | 306 | 20 |
| 14 | 7 | 733 | 42 |



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low as much storage capacity as possible without dropping the reliability much under the ideal of 100 percent error-free operation

If you've paid attention to the options of the DOS FORMAT command, or if you were using a PC during the transition from DOS Version 1.1 to 2.0, you already know how to change these disk dimensions. DOS 1.x formatted disks with only eight 512-byte sectors per track.

Proper disk dimensions allow as much storage as possible without dropping reliability much under the ideal of 100 percent.

Apparently that was excessively conservative, because starting with release 2.0, DOS began safely squeezing nine sectors into the same diskette tracks. If you've experimented with this matter, you may have discovered that occasionally a diskette of marginal quality will format perfectly at eight sectors per track and encounter errors when formatted with nine. With disks of reasonably good quality, nine-sector formatting is reliable enough to use all the time. But it's possible to push things even further-John Henderson has demonstrated with his "J-Format" tricks that diskettes can squeeze a full ten sectors into a diskette track, gaining more storage, and, 1 presume, losing some reliability.

Physical and Logical Formatting

Formatting a disk involves two separate operations-physical formatting and logical formatting. Physical formatting establishes the logical dimensions of the disk space, while logical formatting sets up the structure of the disk as DOS views it. The DOS FORMAT command performs both formatting operations on a floppy disk, Using special commands to the disk controller (which allow the sector boundaries to be written), DOS physically formats the disk, establishing the size, number, and marking of the diskette sectors. After that's done, the logical formatting-which establishes the size of the directory, the disk space map, and so forth-is written on the diskette using the conventional | read-and-write commands.

With a hard disk, on the other hand, the DOS command doesn't do any physical formatting. Instead, DOS's

FORMAT command expects to find the

sectors already established on the hard disk. Next. I'll rev up for a head-on collision with the 32-megabyte barrier.



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Business Graphics:

GIVING POWER TO PRESENTATIONS

PC reviews 36 graphics packages to help you select the right software for your business needs. All do the job, but some offer such features as free-form drawing and libraries of predesigned images.



hose numbers sound okay, but can't you show me what it looks like for 1987?" If you're a business analyst, you've heard words like these a thousand times, along with, "A picture's worth a thousand words, you know." Making pictures out of numbers is what presentation graphics, and this issue of PC Magazine, are all about. Business

analysts particularly need presentationquality business graphics to "show" peo-ple what their results look like, rather than just telling them. As more analysts use PCs in their work, graphics software is moving up in the PC software best-seller list.

"Presentation graphies" packages produce the charts and graphs commonly used for business presentations. Most packages

can produce column, bor, pic, and line charts, but a few do quite a hit more. For example, some products can generate a wider variety of charts, while others enhance plain-looking business graphics with fancy type fonts, free-form drawing.

or libraries of images and icons. In this issue, PC Magazine surveys 36 PC graphics software puckages to help you



determine which best suits your needs. Our original list included a huge number of packages, but the final collection represents a more realistic array of software that's readily available and can produce business presentation graphics. To good down the list, we took a hard look at several important aspects of the usability of graphics software in business applications.

The Weeding Process

We first eliminated products that concentrate solely on producing graphics images on screen. While the capabilities of these products are often extensive and impressive, they don't produce hard-copy graphics output, a requirement of most business users. Products that use plotters to create graphics images on paper or on overhead transparencies predominate, but many programs do a very credible job with dot matrix printers and were not overlooked in these reviews.

Most software programs that allow only free-form dawing, sign making, or CADICAM design exercises were also climinated. Many free-form products produce excellent business graphics but an arist must oft he job. Because most business users want to enter a few numbers and then see a graph poor automateally, we concentrated on products generated that produce business designs (like organization charts) that are difficult to describe mathematically.

It was difficult to eliminate from our reviews the integrated products like 1-2-3, Symphony. Framework, and Enable because most of them produce good-quality presentation graphics. However, the standalone products generally offer more flexible graphics, and many can also integrate data from a wider variety of sources.

Setting the Stage

PC's editors developed a text plan and scenario and assembled a team of reviewers and texters (see "The Review Panel" for their names and backgrounds) to text this diverse group of business graphics programs. We developed a typical business application (see the sidebar, "The Scenario," for details), which, although simple, forced each product to show what it can do in a typical business presentation environment.

Graphics packages vary greatly in how they work and how well they produce the desired graphics images. To reflect the variety, the results of PC Magazine's product



con indicating ouslness presentation praphics program.



Icon identifying artistic business graphics programs that draw graphs.

testing are presented in several ways. First, we highlight each product review with an icon that instantly tells you how it works. Packages that produce business graphs and charts directly from input numbers are identified as "business presentation graphics" products. Those that draw the graph or enhance graphs drawn by other products with external images are labeled as "artistic business graphics" programs.

In addition, each product review describes how well the product id the job and offers a "taste" of what the product is like. For example, a few products use menus and icons for user interface but are not that easy to use. Some require an indepth knowledge of graphies or programming, while others are surprisingly flexible and easy-to-use as well as inexpensive.

Useful Facts

An expanded PC Fact File accompanies each review and contains detailed technical information. The Fact File concentrates on screen and hard-copy graphic abilities, especially the variety of chart

The Review Panel

The following contributors made up the teams that tested and reviewed the business graphics software packages presentation in this issue.

Kathryn Alesandrini, Ph.D., is a speaker, consultart, and author of the upcoming book, Business Graphics for Information Management (Pentice-Hall, Inc.). She is an Associate Professor at California State University and also founder of MicroConnect, a small firm in Santa Monica, California, that specializes in graphics applications.

Diane Burns and S. Venit are authors, microcomputer consultants, and graphics specialists. The two are frequent contributors to PC Magazine. Gabriel Cuellar is the author of six books

about microcomputing, including Graphics Made Easy for the IBM PC (Prentice-Hall, Reston Publishing, 1984). Glenn A. Hart is a consultant in the field

of microcomputer implementation and hardware and software selection. He is a contributing editor for PC Magazine. Maureen Jones is a technical writer and illustrator with an extensive background in computer graphics applications. The Metropolitan Museum of Art in New York City is currently showing a multimedia presentation that she created. Bill O'Brien is a frequent contributor to

PC Magazine.

Charles Petzold coordinates the use of IBM PCs for a large insurance company

and is a free-lance writer on microcomputer subjects.

Alfred Poor is president of softlndustries,

an independent microcomputer consulting firm in Woodbury, Connecticut. Vincent Puglia is a frequent contributor to PC Magazine.

Robin Raskin is a frequent contributor to several computer publications, including PC Magazine. Stephanie Stallings is an associate editor at PC Magazine.

M. David Stone is an author and frequent contributor to PC Magazine. His most recent book is The Parent's Computer Book (Macmillan, 1985).

Jared Taylor is a contributing editor for PC Magazine.

Phil Wiswell is a free-lance writer and software critic. He is a frequent contributor to PC Magazine.

A Guide to the Graphics Fact Files

Each of the reviews on the following pages is accompanied by a Graphics Fact File that contains an extensive list of its technical capabilities. To save space, we used abbreviations to describe those capabilities. Here is a ist of those abbreviations, and their definitions, organized by technical category.

Documentation:

Graphics software documentation should include enough tutorial material to get you going and enough technical and reference information to make you an expert graphics craftsman. These codes should tell you if the product you're looking at has enough of both. not wroth a not wroth a

stu-on-screen tutorial ptu-printed tutorial etm-glossary of terms

idx-index tes-table of contents

Copy Protection:

Copy protection can make a program difficult or impossible to use if you have a hard disk. These codes will tell you if you'll need a key disk to run the program from a hard disk and if backups of the program's floppy disks are limited.

ncp-not copy protected lcf-limited copies of floppy disks hda-runs on hard disk

hdk-runs on hard disk with key

General Graphics Facilities:
These codes let you know whether graphics formats are predefined in the product, whether screen displays are included, and whether the software lets you adjust your output format to accommodate different media, such as transparencies and

paper.
pcf-predefined chart formats
pcd-predefined charts include screen

displays mda-media adjustment

Screen/Printer/Plotter Facilities:

Graphics products accommodate blackand-white screen and output requirements using hatching patterns or allow you to vary the colors displayed in color outputs. Each product's abilities in this area vary, as do their abilities to generate and position chart legends and comments, establish axis and grid definitions, and orient and position the chart

on a plotter or printer.
aht-automatic b&w hatching
t mht-manual b&w hatching

nht-no b&w hatching acc-automatic color choice mcc-manual color choice ncc-no color choice act-automatic chart legends

act-automatic chart legends mct-manual chart legends nct-no chart legends vtp-variable legend position

vcp-variable comment position aas-automatic axis scaling mas-manual axis scaling nas-no axis scaling

agd-automatic grid display mgd-manual grid display ngd-no grid display ato-automatic tick precision

adjustment
mtp-manual tick precision
adjustment

ntp-no tick precision adjustment ppa-plot-area, page-position adjustment hva-plot orientation horizontal/vertical

adjustment psa-page-size adjustment

_

Data-input methods are more important for graphics software than for most other software products because the data is usually generated elsewhere. These codes note the most popular disk-transfer formats along with alternative input methods.

ikb-input from keyboard idk-input from ASCII file ims-input from mouse

ipt-input from pad or tablet iff-free-form input sketching

Chart Typ

While many business users would be happy with just a bar chart, most want a graphics package that can produce a variety of chart types. These are the chart types that have become business standards.

column charts—

These classic vertical bar charts are more popular than almost any other type of business graphic. There are many desirable variations on the theme, however, and each program varies in its abilities to make column charts interesting.

cls-maximum number of columns cgs-maximum number of column groups

cpg-maximum number of columns

per group ssc-maximum number of segments per stacked column

aoc-automatic overlapped column specification

moc-manual overlapped column specification noc-no overlapped column specification

3dc-three-dimensional columns nyc-numeric values on graph

npe-user-positionable numeric values

bar charts-

Bar charts are the horizontal companion to column charts. Most programs that can do columns can also do bars, but may vary in how well they can enhance them.

brs-maximum number of bars bgs-maximum number of bar groups bpg-maximum number of bars per

group ssb-maximum number of stacked segments per bar

aob-automatic overlapped bar specifications

mob-manual overlapped bar specifications

(Guide to Graphics Fact Files continued) nob-no overlapped bar specifications

3db-three-dimensional bars

nvh-numeric values on graph npb-user positionable numeric values

Gantt charts-

Project management would be a lost art without Gantt charts to help managers visualize how their projects are progressing toward the goal. While most project management programs do a credible iob of producing them, many graphics programs now have the ability to make Gantt charts that are refined enough to be used in boardroom presen-

tations ite-maximum number of items . rog-maximum number of rows

fig-fixed time periods utg-user-specified time periods smg-maximum number of symbol types

organization charts-

Tree-shaped organization charts can be used for displaying everything from a company's inner workings to the structure of a database. It's a rare, but highly valued, eraphics program than can do

smo-maximum number of symbols clo-maximum number of connecting

sto-maximum number of symbol types tlo-maximum number of text lines per symbol

vso-variable symbol size

bubble charts-

Bubble charts show the relative values of items by the size and position of circles (bubbles) in a coordinate range. There is a good chance that they will so grow in popularity because graphics programs can create them.

bbs-maximum number of bubbles cpb-maximum number of characters per

lib-label inside bubble lob-label outside bubble lib-label on legend

high-low charts-

Stock market afficionados are especially fond of using high-low charts to track their favorite stocks or indices, but these charts can be used to track anything at all that varies within a range over discrete time periods, such as days, weeks or

ihl-maximum number of items shi-number of symbols

uhl-number of user-specified symbols surface area charts-

Ins-maximum number of lines pls-maximum number of points per line

Program Characteristics:

How a business graphics enhancement package works may affect your choice more than its features. We've included both criteria in the Graphics Fact Files for those products.

design method-

Programs that permit freestyle drawing may be more useful for imaginative enhancements, while more structured programs may be more helpful to the business analyst trying to clarify a simple chart. fsd-free-style drawing

std-structured drawing and formatting

user interface-

Users enjoy working with a variety of menu styles, depending on their needs and tastes. The number of menu options will tell you how much you can probably do with the program.

pdm-number of pull down menus mop-number of menu options top-total number of options imu-icon menus

tmu-text menus

type fonts and sizes-Type font styles and sizes can be important when enhancing a chart. We added more type style information here to emphasize their importance. fnt-number of fonts fns-number of font sizes fny-number of font types

pattern handling-

Predefined patterns can make a program more useful, especially if you're not artistically inclined. Creating patterns is also useful, and filling them with colors makes for more attractive charts. ppa-number of predefined patterns

available upa-user-defined patterns available vpf-variable pattern fill

took available-

Graphics tools let you modify predefined or drawn images, paint them at will, and drag them around your screen. As with any craft, the more graphics tools you have, the more you can do with your

chart image. bbm-hit-by-hit manipulation vpb-variable paint brush

shape and size spc-spray paint capabilities

mir-mirror imaging cop-image copy idr-image drag and reposition

iar-automatic image array generation

predefined charts and images-Some graphics enhancement programs

cannot accept charts from standard business graphics packages, but if you can create them using predefined images, all is not lost. These are the charts and images that may be included. pcl-column

pba-bar ppi pic

phl-high-low par-arca

image libraries-

Image libraries are becoming more popular in graphics enhancement packages. Some programs also allow you to merge a picture with a chart, or with another image-they may also cost extra. pis-number of images supplied (standard)

ila-number of additional image libraries available all-cost per additional image library

sup-can superimpose images and charts

The Graphic Details

PC Magazine designed its sample business application (see below "The Scenario") to test how well the software performed in its basic task: producing normal business charts. A detailed input form helped our reviewers collect consistent information from this eclectic group of programs.

ectectic group of programs.
The primary comparison chart, a pie chart, which appears with each of the reviews, shows which categories of musical instruments are now using the MIDI interface. Each reviewer had to produce this chart in both full-color and black-and-white versions to determine how the programs handled solid fill and hatching.

programs handled solid fill and natching.

They also used the available data to produce either a simple column (vertical bar) chart or a more complex chart with two y axes to show the rapid growth of the MIDI category compared to the slower growth rate for the entire musical in-

strument category. Many programs cannot produce graphs with different y axes, and those that can often produce only one type of dual-axis chart.

type of dual-axis chart.

Other types of charts that the reviewers tried to produce included: a Gantt chart, a specialized form of chart in which boxes "float" in the chart space, positioned to show the start and end dates of some activity; organization charts; and high-low charts, which are used to indicate the closing price for a stock and the highest and lowest prices the stock sold at during the trading day.

Not all the programs tested have the ability to produce all these charts. Instead, PC asked each reviewer to create as many of the charts as possible, as well as any unrequested charts that a given program could create that were unusual or interesting.

-Glenn A. Hart

The Scenario

ComputerBand Incorporated, a fictional hardware and software designer, manufacturer, and distributor, forcuses on computer-controlled music instruments and synthesizers. The new standard, MIDI (Musical Instrument Digital Interface), which establishes comventions for interconnecting computers and instruments, forms the backbone for its products.

its products.

ComputerBand hardware includes a
MIDI card for the PC. This card feature
untilipiexed output that can control up to
six different MIDI-compatible musical
devices. Software options include master
control programs of various complexity
and flexibility to control attached MIDI
forms to simulate various musical instruments, libraries of complex percussion
patterns to control drum synthesizer machines, and so for some procession.

The reviewers were to produce graphic images for a financial presentation to potential investors. ComputerBand's

marketing director insisted on some "sexy, impactful images," but the VP of finance wanted to convey statistics as well. (Note: the statistics are fictitious.)

The reviewers prepared the pie chart that appears with each review from the instructions and data that follow:

Pic Chart Title: Instrument Families Used with

MIDI as of January 1985

Data: Keyboard, 60 percent; Guitar, 20
percent; Percussion, 13 percent;

Other, 7 percent.

Comments: Source: American Music
Association, 1984 Market

Survey, Courtesy AMA Notes: Prepared by ComputerBand, Incorporated, Marketing Depart-

ment, March 1985
Since many programs are not able to include as much comment and note text as specified, we asked the reviewers to use a legend to provide data item names and put the actual percentages near each "slice."—Glenn A. Hart

types that the product can produce and the available options for each type. It also includes information on the product's ability to move objects around and reorient them, insert legends and descriptions, use a variety of typefaces and sizes, and adjust the graphics to different output media.

The Fact File also lists compatible products, including plotters, printers, and monitors. Under the heading "Inputs," it further lists formats that the program can

Graphics packages vary greatly in how they work and how well they produce the desired images.

read. These include data input sources (keyboard, light-pen, mouse, and so on), graphics formats, and data interchange sources (PeachCalc, 1-2-3, ASCII), (See the sidebar, "The Graphic Details," for a full description of the items covered.) We were careful to mention whether or not each program allows you to enter data by hand if none of your sources can produce an acceptable input file product. (Believe it or not, some products don't accept keyboard input.) And, ves, where applicable, we even include details about mouse input. To get this information into a small space, we used three-letter codes (see "A Guide to the Graphics Fact Files," which accompanies this article).

Last, but far from least, we exhibit a chart or two from each product. Each tester tried to produce a pie chart; when this wasn't possible, the test team produced a substitute chart. For as many products as possible, we produced a second chart that shows some other interesting aspect of the product's graphics abilities.

We packed all the information for each product onto a two-page spread so that you can easily locate the good and bad points of all 36 and maybe find the one that can best do the job for you.—John Dickinson



Fast Graphs

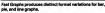
An Old-Timer That Still Ticks Pleasantly

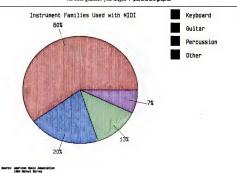
att Graphs, from Innovative
Software, the company that produces the Smart integrated software series, is a business graphics package that has been
available practically since the
birth of the PC. Its early gestation
carries no significant penalty because the product is quite competent even by today's standards.
Fast Graphs uses predefined

graphics formats with fill-in-theblanks forms for graph specification and offers some special features as well.

At first glance, you might

Translate to self-





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Fast Graphs 2.02 Innovative Software 9300 W. 110th St., #380 Overland Park, KS 66210 (913) 383-1089

LIST PRICE: \$350 REOUTRES: 128K RAM, two disk drives

Video boards-IBM Color/Graphics

Printers-Diablo; Epson, IBM; IDS Prism; Okidata M84: Star Micronics: Toshiba: Centronics 353; C. Itoh 8510 Plotters-Hewlett-Packard 7470, 7475: Aradek DXY-100; Houston Instruments; Panas-

VP-6801A; Amplot II; Strobe; Sweet-P; IBM XY/749: Calcome DOS versions-1,1, 2.0, 2.1, 3.0 Other operating systems-none

DOCUMENTATION: Tutorial-otu

COPY PROTECTION: ncp GENERAL GRAPHICS FACILITIES: pcf,

pcd SCREEN GRAPHICS FACILITIES: ssh. asd, msd

SCREEN/PRINTER/PLOTTER FACILITIES:

Hatching-aht, mh Color choice-acc, mcc Legends-mcl Header lines-3

Comment lines-3 Note lines-3 Comment por Type fonts-1 Type font sizes-2 Chart overlays-2

Axis scaling-aas, mas Grid display-mgd Tick precision-atp Page adjustment-none

INPUTS: Sources-it-b Graphics formats-r Standard formats-DIF, ASCII, SuperCalc.

SYLK Column charts-120 cls, 60 cgs, 6 cpg, 6 ssc, noc.

Bar charts-120 brs, 60 bgs, 6 bpg, 6 ssb. nob,

Line charts-6 Ins, 120 ppl, 1 tpl, 6 lsm, vsm, spl Regression types-

Pie charts-12 psl, 12 eps, ppv, apv, epv Text/word charts-1 fpc Gantt charts-non Organization charts-none Bubble charts-none High-low charts-none

Surface-area charts-6 lns

think that Fast Graphs can produce graphs in only three formats: bar, pie, and line. However, each category produces many variations that other products call "distinct formats." For example, the bar chart format can make vertical or horizontal single bars, clustered or stacked bars, line bars, and two- and three-dimensional variations; it even has special provisions for Gantt charts. The line format produces both line

and scatter charts Little Niceties

Fast Graphs relies on the function keys to choose options and the cursor keys to navigate around the various screens and forms. Little niceties abound in Fast Graphs; for instance, the program automatically changes the numeric keypad from number mode to cursor control mode, and back again, as the type of permissible entry changes.

Fast Graphs imports data from foreign files stored in standard ASCII, DIF, SYLK. PerfectCalc, or SuperCalc formats. These files, as well as the data you enter at the keyboard, appear on a spreadsheetlike screen that resembles a blank I-2-3 or SuperCalc display. The program does not include many spreadsheet functions beyond the ability to sum row values. Its spreadsheet design is more of a metaphor than a real spreadsheet. However, it is simple and pleasant to use.

Among its special features, Fast Graphs allows you to overlay two charts for an unusual set of visual effects. It also has a good slide show system that quickly snaps predefined graphs onto your PC's display screen. In addition, Fast Graphs's slide show system is simple and easy to understand

The program's graphics screen-editing facility is most unusual. It's sort of a mini-CAD that enables you to draw circles, arcs, straight lines, boxes, and other shapes on the screen. You can also add regular or double-size characters to the display. After you complete your screen image, you can save it to disk and then superimpose it onto any regular graph. This feature is handy for incorporating company logos or other complex designs into graphs. Fast Graphs's chart options do have

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of choice regarding the size and placement of chart elements. For example, if you want to add comments to a chart, you are restricted to a fixed position and size; in fact, the comments in the test charts often appear too small. In addition, if you set a title line or legend to large size and it is too long, Fast Graphs doesn't alert you; it simply overwrites some of the text into a

mishmash. Aside from these problems, it was easy to define and plot the various PC test graphs. A Hewlett-Packard 7475A plotter quickly produced the plotted output but not always perfectly. The HP is capable of much better edge definition than appears on Fast Graphs's pie charts. This program obviously sends less-precise instructions to the plotter than other programs do. Fast Graphs doesn't consistently do a good job of filling in solid areas. For instance, the legends on Fast Graphs's solid-filled charts are completely solid, while the actu-

> Fast Graphs's graphics screenediting facility is sort of a mini-CAD that enables you to draw shapes on the screen.

Troublefree Installation

al chart areas are not

Fast Graphs has no copy-protection requirements or other confusions to gum up the installation process, and it's easy to specify the plotter and/or printer. The program's documentation is typeset and nicely tabbed but lacks a glossary and index. Its operation is so simple and straightforward that the manual's weaknesses don't really matter all that much, but the documentation is clearly not up to the standard set by the rest of the program. For all its minor problems, Fast Graphs

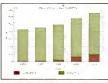
produces a nice array of charts and is quite easy to use. Some newer graphics programs may surpass Fast Graphs, but the package remains attractive in many



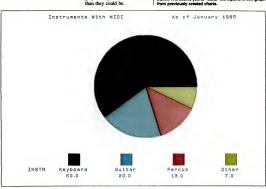
dGRAPH III

dGRAPH III Charts a dBASE Course

ox & Geller has created a series of graphics packages designed to import data from various database and spreadsheet formats. dGRAPH III is its product designed for dBASE III users. After a cursory inspection it appears to be a competent tool for creating charts and graphs, either from information stored in dBASE III files or through its own interactive data entry system. But a closer look reveals that the data inputs could be smoother and the graphic outputs are less attractive



dGRAPH III allows you to "build" the input of a new grap rom previously cree



dGRAPH III L0 Fox & Geller 604 Market Street Elmwood Park, NJ 07407 (201) 794-8883

CIRCLE 660 ON READER SERVICE CARD

LIST PRICE: \$295 REQUIRES: 96K RAM, two disk drives

SUPPORTS: Video boards-IBM Color/Graphics or compatible Printers-Okidata; IDS Prism 80, 132; Anadex

9000A, 9501A, 9001A, 9501A, 7000; NEC Spinwriter; Epson; Diablo 1750; C. Itoh 8510; Datasouth 180 Plotters-Hewlett-Packard 7470A, 7475A

DOS versions-1.1, 2.0
Other operating systems-none
DOCUMENTATION:
Tutorial-sto, ptu
Manual-ick, tes, gtm
COPY PROTECTION: nep

GENERAL GRAPHICS FACILITIES: pcf, pcd SCREEN GRAPHICS FACILITIES: none

SCREEN/PRINTER/PLOTTER FACILITIES: Hatching-mbt

Color choice-mee
Legends-meel
Header lines-12
Comment lines-12
Comment position-none
Type fonts-1
Type font sizes-1
Chart overlays-none
Axis scaling-nas

Chart overlays—none
Axis scaling—nas
Orid display—mgd
Tick precision—mtp
Plot-area page adjustment—none
Plot boriz./vert. adjustment—hva
Page-size adjustment—none
BNPI TISe

Source-ikb Graphics formats-none Standard formats-ASCII, DBF

CHART TYPES: Column charts-52 cls, 4 cgs, 52 cpg, 4 ssc, noc Bar charts-52 bs, 4 bgs, 52 bpg, 4 ssb, nob

Bar charts-52 brs, 4 bps, 52 bpg, 4 sbl, nob Line charts-4 int, 52 ppl, 4 tpl, 4 lsm, utl, usm Regression types-none Fie charts-1.9 pal, apv, usp Texti-word charts-none Gunt charts-none Bubble charts-none High-low charts-none Surface-area charts-4 ins

The program does a commendable job of importing data from dBASE III. dGRAPH takes the data and lists the names of all the fields in the database. Graphs are created as you specify which data input fields should be graphed. Furthermore, you can manipulate the data input fields in a variety of ways-you can perform arithmetic operations on any fields, charting averages of data, counts of records, and percentages of a sum or of a count. Using dGRAPH III, it is possible to visually represent information contained in any dBASE III database. Unfortunately, the graphed information is not especially attractive, and the process deserves a better-

documented tutorial.

Creating a graph with dGRAPH's own data entry system involves naming the graph, defining and entering the input, selecting the type of graph, and specifying its characteristics.

In addition to standard bar, line, and pie graphs, dGRAPH allows you to create the less-common pie-bar (a type of sliced bar chart) and multichart. The dGRAPH's multichart is a viable alternative to overlaid charts; however, the creation process is a tricky, hit-or-miss proposition. The feature allows you to print either two color or three black-and-white graphs next to one another. Because the original chart labels will almost always be too long and run into one another, they must be cropped. The multichart requires a new mock-up, with new graphs stored to a new extension, in order to fit the page. Inevitably, you must "guestimate" the graphed results until you get it right.

The program sports come powerful enhanced features, You can "build" the input of a new graph from previously created aGRAPH? charts. An "sutograph" feature lets you customize default parameters, including shadings and sealings. There's an inverse option for reversing the backyound frorground video. With the zoom option you can crop empty space from but all mental services of the properties of the properties of the properties of mulate." feature allows you to create stacked bar chart from cumdative data. Averages can be automatically indicated on any line or bar graph.

Coupled with these advanced features are some serious limitations. Titles, notes, and comments are restricted and severely abbreviated in normal dGRAPH operations. To put reasonable titles on a graph, you must create a special text file. This file is not available to the display screen, but it can be printed or plotted.

The data entry screen is limited to 4 colums and 52 rows (bar and line graphs) or 12 pie slices. This restriction made it impossible to plot the standard 5-column bar chart used during this project in more than one color. Furthermore, dGRAPH text is restricted to one font and one font size, which makes it difficult to vary the look of your graphs. The font is not especially attractive; it's thin and has a crude dot matrix.

It's easy to lose your way in dGRAPH's series of screen-naming conventions. dGRAPH files have different extension names for the printed version, color version, black-and-white version, single-chart version, multichart version, and others too numerous to mention. The possible scenarios for error are endless.

Occasionally aGRAPH specters hautt the screen. Once, when the program couldn't find a file, it chose to draw its wow, complete with its own set of data. This mystery GOMANGO BAT file appeared in the program's directory, but if dispensed upon receive to DOS. In anhorized the program's directory, but if dispensed upon receive to DOS. In anhorized the dispense of the program's directory, but if dispensed upon receive to DOS. As provision and some general housekeeping are sordy needed.

The graphs you save eat up disk space: Creating six graph examples consumed an entire disk. The program has a busy, cluttered feel to it-the screen displays have too much information for comfort, and the manual is too crowded to make the purpose of any given screen tutorial easily distinguishable. The plotted output is disappointing compared to the screen imageit's poorly filled, the pie charts are composed of individual jaggedy tangents, the colors aren't deep, and the text fonts have a very matrixlike appearance. While the program's purpose-transporting and graphing database information-is fulfilled, the execution needs improvement. dGRAPH III is an expensive package that really should produce better than "so-so" output.



Micrograph by 2Y's

Rigid and Limited Graphics

A

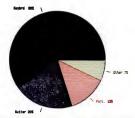
bare-bones program, Micrograph by 2T's (das MCG) is easy enough to learn in an hour but offers no extrats to captivate a govening user. It draws line graphs, histograms, and pic charts and performs some statistical analysis. With the reduction of program complexity comes a corresponding lack of count lot ent the country of the country

involves getting data into a file that MCG can use and display graphically. The easiest way to enter data is to type it directly into MCG. The program can also import data from VisiCalc, 1-2-3, SuperCalc, and dBASE II, but you must set up the spreadsheet in precisely the right manner or MCG will not accept the input.

gram complexity comes a correpsonding lack of cortol over the final product, and because MCG's grapks all look similar, they are bland and uninteresting, they are bland and uninteresting, and data entry screens to create a graph. The black of the program

Instrument Families Used with MIDI

As Of January 1985



MCG's pie charts can only accommodate two data series, which are eventually displayed as two pie charts side by side.

Micrograph by 2Y's 2.0 Willy Verbestel 12 D'Amour Aylmer, Queber Canada J9J 1C2 (819) 770-7191

CIRCLE 600 ON READER SERVICE CARD

REQUIRES: 128K RAM, one disk drive

Video boseds-IBM Color/Graphics Printers-Epson MX, FX, and compati

Okidata M84 Plotters-Hewlett-Packard 7470-A. Radio Shack CGP-115 DOS versions-1.1, 2.0, 2.1, 3.0 Other operating systems-none

DOCUMENTATION: Totorial otto Manual-gtm, tor

DEST PRICE - \$105

COPY PROTECTION: ncp. hda GENERAL GRAPHICS FACILITIES:

pcf, pcd SCREEN GRAPHICS FACILITIES: none

SCREEN/PRINTER/FLOTTER FACILITIES: Hatching-ol Color choice-acc

Legends acl, no Header lines-2 Comment lines-0 Note lines-0 Comment pos Type fonts-1

Type fout sizes-3 Chart overlays 0 Axis scaling-eas, m Grid display-ngd Tick precision-no

Page adjustment-hva (printer), pr INPUTS:

Sources-ikb Graphics formats-n Standard formats-DIF, PRN (SuperColc),

CHART TYPES

Column charts-96 cls, 24 cgs, 4 cpg, 4 ssc, noc. nw Bar charts-none Line charts-4 lns, 24 ppl, 4 tpl, spl, rcl, rdl

sion types-lines Pie charts-24 psl, apv Text/word charts-non Gantt charts-none

Organization charts-n ole charts-none gh-low charts-none

can appear in a legend.

A maximum of four series can be entered, all of which can be displayed in a column or line graph. Pie charts can only accommodate two series, and the result is graphed as two pie charts displayed side by side. MCG can also create scatter charts and perform linear regressions. The points on the scatter chart are approximated by a straight line. Both the screen display and printed version of these graphs display calculated means, standard deviations, and other statistical goodies.

MCG's data-entry process is rigid. The data is entered into columns, but you cannot maneuver about the columns as you would with a spreadsheet package. MCG offers some "slash commands" to facilitate entering and editing of data, but they often do not work as they are supposed to. For example, typing /D, intended to delete a series of data, has no effect.

It's not unusual for MCG to mangle your data. Sometimes whole columns of figures suddenly change values. Sometimes legends disappear. You can edit data items individually, but the process is a tedious one. You can't insert or delete a data item in the middle of a series of observations without typing in all or much of the entire range. Usually it's easier to type the entire data column over again.

When you define a new graph or modi- pleasing or interesting.

fy an existing one, the new version will be added to the existing file without deleting the old. These versions within the same file are called "layouts." Thus, you'll wind up with a single file containing various layouts of data and graph definitionssome of them good, some of them bad, some of them just slight modifications of others. The problem is, you can't delete unwanted layouts individually. You must create a new file, move the layouts you wish to save, into it, and delete the old files. This system is clumsy and likely to create a confusing mess. The manual is not typeset and is printed

on only one side of the paper. It does not provide any screen shots to guide you through the data entry. Without screen diagrams in the documentation, it's difficult to figure out the relationship between data entered and graphic output.

The MCG manual has less than 30 pages of text and over 10 pages of unimpressive sample graphs. The sample illustrations are not captioned or identified. Standing alone, and unexplained, the sample graphs are not especially helpful; perusing them only confirms that there are no

"hidden" features in MCG. The graphs you can create with MCG. although legible and accurate, are locked into a rigid format that is not especia





Infographics CHOICE

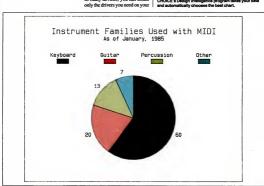
A Full Menu of Choices

HOICE from Infographics is a graphics program that tries hard to live up to its name. Although the number of basic chart types it will prepare automatically from your data is limited, you can combine these types and layouts in so many (over 3,500) ways, your options seem much broader. The program also supports an unusually wide variety of graphics cards, monitors, pen plotters, and printers.

Because CHOICE supports so many devices, you can install



CHOICE's Design Int



Infographics CHOICE 2,0 Infographics, Inc. 17961 Cowan Avenue Irvine, CA 92714 (714) 474-1530

CIRCLE 694 ON READER SERVICE CARD LIST PRICE: \$395

working disk-a process clearly explained in the documentation. Once the drivers are installed, the program lets you switch between two monitors, two printers, and a

pen plotter. CHOICE is menu-driven. You enter most commands by pointing to your choice with the arrow keys and pressing Esc. The basic chart types available are bar, surface area, horizontal bar, stacked bar, stepped line, and pie. The number of ways you can combine charts into layouts is amazing: You can mix line graphs with bar charts, columns, and pies. The program allows you to specify a variety of grid arrangements in the layout. For example, you can indicate that you want a grid for a line graph, bar chart, or surface chart on the left-hand side of the page with two pie charts on the right-hand side.

Data Entry Entering the data to be charted is easy. You can use up to three lines for the title. Next, you define the number and name of each data set, which CHOICE calls a data "key." followed by the number of categories within each data set. CHOICE then presents a spreadsheetlike table listing each data-set title down the side with each category label across the top. Entering the data and editing it is as simple as using a spreadsheet.

When you type in all the data for a chart and save it to disk, the program appends the suffix .DIF to the filename to indicate that it is storing the information as a .DIF file. This format permits instant use of information from a spreadsheet such as Visi-Calc. When you want to retrieve your data file, you must type in the entire filename, including the .DIF extension. At this point, it would be nice if the program provided the extension for you, since it is always the same. Also, to load the file, you must press Return afterwards. Since this is one of the few places in the program where Esc is not used to enter information, you might find it confusing to suddenly change to the Return key.

Once you have entered the data, you may use the program in one of two ways: You may either specify how the chart should look by answering a series of questions about the chart, or you may invoke a program called Design Intelligence, Design Intelligence takes the data you have entered and automatically chooses the best way to represent that data, including the type of chart. In this mode, CHOICE makes the decisions for you, giving you no say whatsoever in how the chart looks. The program did an excellent job of graphing the information we entered and chose a chart type that was actually clearer than the one we selected when preparing the chart

manually. To produce a chart without using Design Intelligence, you select the device to which you want to output the chart and answer a series of questions about the chart's format. After plotting the chart, the program asks if you want any additional copies, which saves you from having to answer the format questions again for that session. However, the format is not saved to disk for use in later sessions-an unfortunate omission in the overall design.

Although CHOICE offers a wide selection of chart types, certain chart character-

> The program supports an unusually wide variety of graphics cards, monitors. and printers.

istics cannot be changed. For example, you cannot turn off the grid lines in a line chart or graph, and you cannot change the format of the legend or specify whether or not to even have one. Nor do you have a choice of different fonts; the program always uses very legible, but basically boring, block letters.

Despite these shortcomings, the charts produced on the IBM graphics screen are as good as the resolution allows, and those drawn on a plotter are of high quality. CHOICE's unique Design Intelligence feature is a real plus for those who don't have the time or interest to become expert chartists. CHOICE offers a good variety of options and, if you don't mind its limits tions, it is a solid investment.

REOURES: 128K RAM, two disk drives SUPPORTS.

Video boards-1BM Color/Graphics or Monochrome, Plantronics Plus, Hercules IBM 3270-PC Printers-IBM Color Epson; Data Products;

Diablo 630: Transtar 315: Centronics 250 Plotters-Hewlett-Packard 7220, 7220T. 7470A, 7475A; Houston Instruments DMP29,

DMP40 DOS versions-2.0, 2.1, 3.0 Other operating systems-CP/M

DOCUMENTATION: Tutorial-ptu

Manual tes COPY PROTECTION: lcf, hda

GENERAL GRAPHICS FACILITIES: pcf, pcd

SCREEN GRAPHICS FACILITIES: sub SCREEN/PRINTER/PLOTTER FACILITIES:

Color choice-acc, mcc Legends-acl, none Header lines-3 Comment lines-none Note lines_none Comment position-none Type fonts-1 Type font sizes-1 Chart overlays-6 Axis scaling-aas, mes Grid display-mgd

Hatching mht

Tick precision-ntp Plot-area page adjustment-ppa Plot horiz./vert. adjustment-hva. Page-size adjustment-none INPUTS.

Sources-ikb Graphics formats-none Standard formats-DIF, SYLK, SDF, SDI

CHART TYPES: Column charts-60 cls, 6 cgs, 60 cpg, 6 ssc,

noc Bar charts-609 brs, 6 bgs, 60 bpg, 6 ssb, nob Line charts-6 lns, 60 ppl, 6 tpl Regression types-non Pie charts-6 psl, 6 eps, ppv

Text/word charts-none Gantt charts-none Organization charts-none Bubble charts-none High-low charts-none Surface-area charts-6 ins., 60 pls

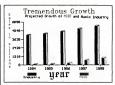
PC Illustrator

Freehand Illustrating for Graphics with Pizzazz

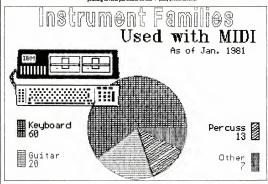
P

C Illustrator combines freehand drawing and business graphics in one easy-to-use package. It enables you to create charts and has arious tools for adding pizzazz to your graphics presentations, including a MacPaint-like interface complete with paintbrushes, fill-in patterns, icons, and an arrow-shaped cursor.

PC lilustrator offers the standard chart types: bar, area, line, and pie. Special features include two- and three-dimensional bars, stacked bars, and the option of printing several pie charts on one



PC Hlustrator's chart enhancement options can produce



(404) 876-9469

time, and you must return to the main

menu each time you want to select a differ-

ent drawing tool. This requirement makes

the drawing process less free-flowing than

if you could select the tools from the draw-

ing area itself. It's unfortunate that this

program does not come with more exten-

screen. You indicate which pictures you

The manual is unattractively printed but

adequate. Its explanations are terse, but

good enough, since the program is so easy

to use. The manual says that you can make

a copy of the program disk with DISK-

COPY and then put DOS on it. The fact is

PC Illustrator has

interface complete

with paintbrushes.

icons, and an arrow-

a MacPaint-like

shaped cursor.

that you can't copy all the files from the

original disk to a blank disk formatted un-

der DOS 2.0; there is not enough room.

You can squeeze the whole program onto

one disk only by deleting some of the sam-

trator lacks options that you may not want

to live without. For example, it will not let you use more than one scale on the same

chart. It gives you no leeway in numbering

the tick marks-you can't choose the step

for each numbering increment. Also, the

highest value of data becomes the top of

the chart scale-you can't designate the end point of the scale. Some will find the

inability to print in color unacceptable

Still, it's a great buy for \$95.

ple images that come with the program. Despite all its good features, PC Illus-

sive freehand graphics libraries.

color curtain between pictures.

On with the Show

CIRCLE 680 ON READER SERVICE CARD

LIST PRICE: \$95 REOUTRES: 256K RAM, one disk drive

Video boards-IBM Color/Graphics Printers-Epson Graftrax; IBM Graphics; Hewlett-Packard Thinklet; Canon Ink Jet; Quadram Quadiet; C. Itoh 8510

COPY PROTECTION: non GENERAL GRAPHICS FACILITIES: pcf.

SCREEN GRAPHICS FACILITIES: ssh.

asd, med from one picture to the next and dropping a

SCREEN/PRINTER/PLOTTER FACILITIES Hatching aht, mht

Legends-acl, mcl, vip Header lines-unlimited Comment lines-unlim Note lines-unlimited Comment position-fcp Type fonts-8 Type font sizes-9 Chart overlays-unlimited Axis scaling-eas Grid display-agd

Page adjustment-psa INPUTS: Sources-ikb, ims, ipt, iff

Standard formats-non-PROGRAM CHARACTERISTICS:

Design method-fisd, std

Pattern handling-20 ppo Drawing tools-bbm, vpb, cop, idr Predefined charts and images-pcl, ppi, pli, psi

column, line/column, line/stacked column,

page. With the Create Graphs menu you choose the chart type, fill patterns, colors, and grid pattern. You can create other chart types using two graphic-symbol libraries, one for electrical diagramming and one for computer program flowcharting. The program also offers several text options for word charts, and you can enhance and manipulate any chart with the freehand drawing tools-features that are not often available with charting pro-

You can use PC Illustrator with the PC keyboard, a mouse, a light-pen, or a digitizing pad. The program also lets you work in color on the screen; you can select three foreground colors on one background color from a palette of seven. The program prints on Epson or IBM dot matrix printers only: the output looks good for dot matrix printing, but you can't print in color. The printer driver does not require any special

installation. The program is entirely menu-driven. Icons represent all menu selections. You can make selections only by pointing with the cursor. Moving the cursor around with the arrow keys is slow, but tests found the cursor response to a Microsoft mouse to be fast and accurate

Entering chart data is extremely easy. A data worksheet presents a row-by-column matrix; each row is a data set, and each column represents the data values for each category. Editing the data is as simple as changing an entry on a spreadsheet. Once you have saved your chart data, you can indicate where you want the chart to appear on the screen, thus leaving room to draw a freehand picture on the empty portions of the screen around the chart.

In the drawing mode, you can add a chart title or other labels at any location on the screen. Text is available in any one of eight fonts, each of which comes in nine different sizes and can be displayed horizontally or slanted to the left or right at a 45- or 90-degree angle. You can move parts of images around the screen or duplicate them. You can also cut or copy parts of one screen and paste them onto another screen. To fine-tune an image, you enter the editing mode, in which the image is blown up to eight times normal size, allowing you to work with individual pixels. You can work on only one picture at a

PC MAGAZINE . JUNE 11, 1985

Plotters-cone DOS versions-2.0, 2.1 Other operating syste DOCUMENTATION-Totorislants

Manual-gtm, idx, tes PC Illustrator has a "slide show" feature that replays a list of picture files on the

want to display along with the length of time they will appear on-screen and special display effects, which include dissolving

Color choice-acc, mos

Tick precision-may

Graphics formats-none

User interface-93 mop, imu, tmu Type fonts and sizes-8 fnt, 9 fns, 8 fny

Other business chart formats-variance, stacked

Image libraries-4 pis, sup



EnerGraphics

A Step Ahead of the Rest

nerGraphics is an energetic number cruncher that turns data from a variety of sources into good-looking graphs and technical pictures. It's a full-service graphics package that generates all the standard chart formats based on mathematical functions, data files from popular

programs, and direct input from the keyboard. EnerGraphics even includes a screen slideshow option, free-form drawing, and libraries of prestored symbols and fonts. EnerGraphics is really a step ahead of the rest with a new dimension in "electronic drawing boards"-operated with the PC's cursor keys, this screen window can accept drawings not only of two, but of three

While other packages may offer 3-D look-alikes, EnerGraphics brings you the real thing. In

fact, EnerGraphics's 3-D feature makes you think you're using an engineering workstation. To produce a 3-D image, you either type in the appropriate mathematical function or build it on the drawing board by creating its "surfaces." It's no snap to work with the 3-D drawing board, but with some time and patience, you can do such neat things as draw a simple rectangle and then rotate it around a reference line to produce a 3-D column.

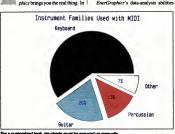
The advantage to real 3-D graphics is that the images can automatically manipulate. "Pseudo" 3-D images or graphs are not very good because you can't view them from the other side or from below; you have to create those perspectives manually and store them separately. EnerGraphics stores objects and surfaces in 3-D. Once you define and store a 3-D image, the program automatically rotates it, flips it, enlarges or shrinks it, and removes "hidden" lines (lines that would be hidden from display if the image were solid).

are impressive. Line charts, for example, can contain up to 10 lines and 200 data points and can use logarithmic or semilogarithmic scales. If you want to plot a line chart from many data points, you have a choice of using either curve-fitting, linear regression, or polynomial regression to determine what line best describes your data. Or you can plot the data points without a trend line in a scatter graph.

Bar graphs are equally impressive in EnerGraphics. The program produces all the major bar chart variations including stacked, overlapping, negative, vertical, and horizontal, plus multiple bars with multiple scales. You control the colors and fill patterns from the menu of choices. In contrast, EnerGraphics's pie charts lack the mouth-watering special effects of the other charts because there's no 3-D option for them. For a customized look, you must manually spruce up your pie charts on the

electronic drawing board. The 2-D and 3-D drawing boards make up the backbone of this package. They are so sophisticated that engineers could use them to do basic computer-aided design (CAD). Drawings can contain up to 800 lines and 200 arcs and symbols-perfect for architectural designs, floor-plan layouts, and so forth. Freehand drawing from the keyboard can be slow and cumbersome, but the fun begins once you have a drawing on the screen. You can rotate text or drawings, blow them up or shrink them almost without limit, and replicate them elsewhere on the screen. If you use special pictures or symbols repeatedly, you can design them dot-for-dot rather than using the line-oriented abilities of the drawing board. The program gives you a handy way of creating these dot-matrix patterns: an empty grid in which each square of the grid represents one dot. You simply fill in the grid to produce the desired pattern.

Collections of prestored symbols come with the package and are useful for certain technical drawings. The libraries are called



EnerGraphics 1.3 Enertronics Research. 150 N. Meramec, #207 St. Louis, MO 63105 (800) 325-0174 (314) 725-5566

LIST PRICE: \$350; \$450 with plotter support REQUIRES: 128K RAM, two disk drives

SUPPORTS:

Video boards-IBM Color Graphics, Plantronics Tecmar, Paradise, Quadran

Printers-Epson; Okidata Plug 'n' Play: NEC 8023A; C. Itoh 8510; Mannesmann Tally 160 Plotters-Amdek; Houston Instruments DMP29, DMP40, DMP41; Strobe 260; Hewlett-Packard 7470, 7475, 8445; Calcomo 84; IBM XY/749; Strobe 260, Sweet-P;

Mannesmann Tally Poxy: Roland XY880 DOS versions-1.0-3.0 Other operating systems-none

DOCUMENTATION: Tutorial-ptu

Manual-idx, tes COPY PROTECTION: DCD

GENERAL GRAPHICS FACILITIES: pcf, ned, más

SCREEN GRAPHICS FACILITIES: ssh.

asd, msd SCREEN/PRINTER/PLOTTER

FACILITIES: Hatching-aht, mi Color choice-acc, mcc

Legends-act, none Header lines-1 Comment lines-none

Note lines-none Comment position-nor Type fonts-4 Type font sizes-unlimited

Chart overlays-none Axis scaling-aas, mas Grid display-and, med Tick precision-are Page adjustment-ppa, psa

INPUTS:

Graphics formats-none

Standard formats-DIF CHART TYPES:

Column charts-25 cls, 24 cgs, 10 cpg, 10 ssc, aoc. 3dc. nvi

Bar charts-25 brs, 24 bgs, 4 bpg, 10 ssb, ach, 3db, nyb

Line charts-10 ins, 200 ppl, 1 tpl, 7 ism, sll, fll, spl. rcl, rdl

Pie charts-15 psl, 15 eps, epv Text/word charts-4 fpc Guen charts-none Organization charts-none Bubble charts-none

High-low charts-none Surface-area charts-10 Ins

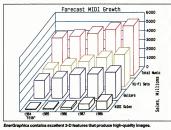
templates because you use the symbols as building blocks to develop your drawings. Ten templates as well as four alternate type fonts and all of the Greek symbols are shown in the appendix of the manual. The electrical and mechanical symbols will probably interest only specialized users while the flowchart template has wider ap-

plicability. Getting started with EnerGraphics takes time despite a friendly menu, an organized manual, and example data to be used with the manual's tutorial. One problem is that creating drawings using keyboard input is cumbersome (the company plans to adapt the program to accept input from x-v graphics devices such as a digitizers and tablets). Drawing 3-D graphics surface-by-surface is not easy. Another problem is a nearly illegible manual. Evidently, the company shopped around for a new printer, because the newest version of the manual is legible. Yet the original problem of photoreduced figures and print of screen displays remains.

In general, Enertronics Research should have paid more attention to details in designing and testing the package. The program crashed several times while I was just trying to follow directions. Another minor but annoying point is that it's easy to confuse the "draw graph" function key with its neighboring "create graph" function key, which destroys all of the data without warning and cleans the slate for a new graph. Since the two options sound so similar the program should at least doublecheck that you really want to restart the creation process before it throws out the data you have entered.

The package does offer a slide-show feature so that you can display in sequence the graphics you create. But one limitation is that you can store only 18 slides on one disk. Also, to use graphs and drawings generated from data or mathematical functions in the slide show, you must first save them as slide-show pictures-but there's no room for the associated data. This extra step in creating a slide show takes time, but the resultant images appear instantly on the screen. That's a nice feature because the 3-D graphics, complete with hidden-line removal, can take a long time to plot-a fact that the manual fails to mention. By first saving all of your generated graphics as screen pictures, your slide shows can instantly flip through 3-D graphics, bar and line charts, and technical drawings.

If you have a lot of data and need a heavy-duty data-analysis package that can produce detailed technical drawings and good-looking graphs, you don't have to look any further-EnerGraphics may be one of the better business/presentation graphics packages available.





Microsoft Chart

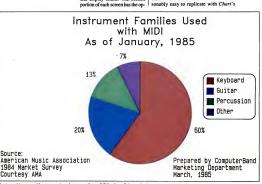
Missing Mouse Complicates a Great Product

hart is the PC version of Microsoft's business graphics program for the Apple Macintosh. It has some peculiarities, but it does

many things extremely well. Its most peculiar characteristic is that, unlike the Macintosh version, it doesn't use a mouse. Instead it attempts to use cursor movement keys to accomplish

the functions of a mouse. The basic user interface employs three distinct screens to define a "data series," enter data, and display charts. The bottom tion menu and the message and status lines. Since the user has to remember the special key assignments in order to move around the screen, Microsoft should include a function key template.

A data series includes only two elements or variables, designated "category" and "value." "Category" refers to the type of data, and "value" stands for the numerical data. If there are several data elements in one category, a separate data series must be created for each repetition of the category. For example, product sales data from five regions would require five distinct data series. Similar series are rea-



Source:

1984 Market Survey

Courtesy AMA

Microsoft Chart 1.00 Microsoft Corporation 10700 Northup Way Bellevue, WA 98009 (206) 828-8088

REQUIRES: 128K, one disk drive

Graphics

Packard LaserJet, ThinkJet; NEC 8023; Okidata 2410, M92, M93, M84; IDS Prism; Plotters-Amdek Amplot II, 6 Shooter;

DMP 29, DMP40; IBM XY/749, XY/750; Hewlett-Packard 7470, 7475, 7550; Strobe 260: Sweet-P

DOS versions-1.0 through 3.0

Tetorial-ptu Manual-gtm, idx, tes

COPY PROTECTION: bda

GENERAL GRAPHICS FACILITIES: pcf, pcd, mda

SCREEN/PRINTER/PLOTTER

FACILITIES: Hatching-aht, mht Color choice-acc, mcc Legends-acl, mcl, vip Hender lines-unlimited Note lines-unlimited Comment position-vep Type fonts-12 Type font sizes-255 Chart overlays-16. Axis scaline-aas, mas Grid display-agd, med

Tick precision-atp, mtp Page adjustment-ppa, hva, psa INPUTS:

Sources-ikb Graphics formats-none

Standard formats-ASCII, DIF, dBASE SDF, SYLK, Lotus WKS, Multiplan Binary

Column charts-512 cls. 64 cgs, 8 cpg, ssc unlimited, aoc, moc, nvc, n

aob, mob, nvb, npl Line charts-512 lns, 64 ppl, 16 tpl, 10 lsm, utl.

usm., sll. fil., spl., rcl., rdl Regression types-average, cumulative. difference, exponential, percent, trend, linear

Pie charts-64 psl, 64 eps, ppv, apv, epv, uap Text/word charts-12 fpc, btx Gantt charts-none

Organization charts-non Bubble charts-none High-low charts-64 ihl Surface-area charts-512 Ins., 64 pls

LIST PRICE: \$250

SUPPORTS:

Video boards-IBM Color/Graphics or Hercules

Printers-Epson FX, MX, JX, LQ; IBM Graphics, Color: C. Itoh 8510: Hewlett-

ApplePlot: Calcorny, Houston Instrumer

Other operating systems-none

DOCUMENTATION:

SCREEN GRAPHICS FACILITIES: none

Comment lines-unlimited

CHART TYPES:

Bar charts-512 brs, 64 bgs, 8 bpg, ssb unlimited,

copying facilities. The data series method title is the name of the first data series. makes it easy to control what data is plotted, especially when you want to plot more than one series on the same illustration, but

it is not as intuitive or easy to understand as a simple chart or table.

Defining a data series, like most Chart operations, involves filling in supplementary menus/forms at the bottom of the screen. Extensive context-sensitive online help is available at all times. Entering data from the keyboard is straightforward. Chart is supplied with an interesting "Rosetta Stone" data conversion program. which uses a wide variety of interchange formats such as DIF, SYLK, and dBASE SDF to manage the import or export of data between Chart and external pro-

Once you enter data, Chart produces good charts on the screen. The program offers a good assortment of predefined formats, including area, bar, column, highlow, line, pie and scatter charts as well as some combinations. The choices are displayed graphically in Chart's "gallery." and when you select a certain type of chart, a submenu illustrates further choices.

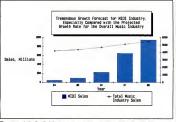
After you finalize your choice, Chart quickly calculates and displays a chart. The program composes fine default graphs, but they usually require some manipulation. For example, the default chart that lofty status.

which would rarely be appropriate.

There is a comprehensive array of possibilities at your disposal for refining a basic chart. For example, boxes of various types can be drawn around any text. You can designate color and fill patterns for nearly every element of a chart, and even insert tick spacing and arrow pointers. To manipulate a basic chart even further, you can sort data, perform mathematical analyses such as averaging, standard deviation, and trends, and you can also override the program's automatic axis ranges. Next, you can create overlay charts, link charts that have formats or data in common, combine charts, display multicharts simultaneously, and much more.

Within the format limitations intrinsic to the design. Chart offers as much flexibility as anyone could want or need.

Microsoft's documentation is complete and detailed, with a reasonable tutorial. Overall, Chart's trade-offs between flexibility and ease of use have been well chosen. The predefined formats can produce good-quality charts with minimal effort once the data entry concepts are mastered, but there is flexibility and complexity galore for the power user. If the PC version of Chart used a mouse, it would be great, but, even so, it approaches





PC Presents!

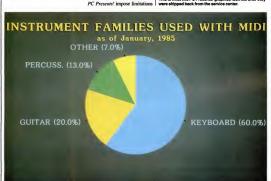
Not-So-Great Graphics for 1-2-3

otus's 1-2-3 creates plain lowresolution graphics, yet thousands of business people routinely rely on it as their central software package. Wouldn't it benice if you could spruce up 1-2-

3's simple graphics for presentations?

PC Presents! proposes to do just that. This package enhances the low-resolution graphics you've already constructed using standard 1-2-3 inputs. It also lets you design simple text screens. In However, the enhancements in TREMENDOUS GROWTH FORECAST FOR MID sequenced to exertal solutions when the second solutions of the sec

This is what two PC Presents/ graphics look like after they



PC Presents! Imedia Corporation 10441 Bandley Dr. Cupertino, CA 95014 (408) 255-5500

CIRCLE 677 ON READER SERVICE CARD ·

LIST PRICE: \$350 REQUIRES: 192K RAM, two disk drives

SUPPORTS: Video boards-IBM Color/Graphics Printers-not applicable Plotters-not applicable DOS versions-2.0, 2.1 Other operating systems-none

DOCUMENTATION: Tutorial-otu

Manual-gem, idx, tes
COPY PROTECTION: bdk
GENERAL GRAPHICS FACILITIES: pcf,

SCREEN GRAPHICS FACILITIES: aib SCREEN/PRINTER/PLOTTER

FACEUTTEES
Hatching-ahr
Color choice-mcc
Legends-acl
Header lines-2
Comment lines-aone
Note lines-none
Comment position-none
Type fones-2
Type fon sizes-3
Chart overlays-aone
Axis scaling-ass, mas
Grid display-agd
Tick precision-nap

Page adjustment-none
INPUTS:
Sources-Lotus's 1-2-3
Graphics formats-none

Standard formats—Lotus WKS
CHART TYPES:

Column charts—200 cls, 6 cgs, 6 ssc, noc Bar charts—none Line charts—6 lns, 200 ppl, t tpl, 5 lsm, usm, spl Regression types—none Pic charts—200 psl, epv

Pie charts-200 pal, epv Text/word charts-2 fpc, 6 bts, ctx, jtc, btx, utx Ganit charts-none Organization charts-none Bubble charts-none High-low charts-none Surface-area charts-6 lns

on 1/2-3's already meager graphing capabilities. Another drawback to the program is that you see nothing until you've shipped your enhanced graphic to a PC Presents' service center and have the output shipped back.

The software consists of four disks, designated system, text, utility, and backup. Both the system disk, which contains the graphics enhancement programs, and the text disk use a simple series of 1-2-3like menu selections for every step of the process; you'll never be in doubt about what to do not?

The first control of the control of

The Limitations

PC Presents!'s enhancement options can't overcome some of 1-2-3's more serious graphics limitations. For instance, PC Presents! doesn't allow you to manipulate individual elements of a graph; you are still locked into 1-2-3's rigid formats for titling, labeling, and legends. Nor does PC Presents! enable you to do anything beyond pie, column, and line charts; you can't create high-low, Gantt, or organizational charts, or charts with double axes. No matter how brilliant a color you choose, the design of a graph is still important. When you cannot manipulate the design and must constantly resort to the same simplistic format, presentations become inherently sterile.

PC Presents! does not allow you to preview its enhanced graphics, either by displaying them on a screen or by outputting them to a primer or plotter. You won't know what your enhanced graphic will look like urtil it comes back from the service center, and by then, you've already paid for it. PC Presents!'s text component, however, is more straightforward. It operates independently from 1-2-3 and lets you create mock-ups of bulleted lists and text slides. Once you've created a text slide, you can enhance in by specifying such attributes as text size, dropshadows, justification, highlighting, and underlining. While the text slides are easier to create than the graphics, they also force you to wear an artistic stratigizeket. You can't do borders, specify yimbols, or place type in a vertical orientation. At least the text component lets you preview your slides for appearance and placement.

Ordering the Work

When you've completed your specifications for graphics or text, you incorpare them into a work-order file using the form of the program. You specify your name, account number, desired turnarout directions of payment, and the amount and type of media you want. You can choose slides, transparencies, or photographs. This process is easy and well documented.

You then send your work-order file, either by modern or mail, to the nearest production house with which the parent company of PC Presentst. Imedia Software, has arrangements. Unfortunately, even if you send out the information via modem, it must return by mail or messenger. At best the process takes 24 hours (wice as long for color media). And the rates are expensive.

A 35mm color slide in a plastic mount corts \$25, and an overhead transparency costs \$24, that is, if you op for a 2-day that is, if you op for a 2-day that is, if you op for a 2-day that plan to create a foot of visuals from your 12-3 graphs, you might want to buy stock in lamella A, slide production house under the same work in almost the same amount of time for almost the same price (\$50 to \$100, and you'll have more options to \$100, and you'll have more options to

Anyone who uses Lotus's 1-2-3 extensively and relies on 1-2-3's graphics for presentations may find PC Presents! a useful tool, especially since Imodia plans to release a local server that will allow you to display high-resolution images on your own monitor. There are map better ways to create visuals, but there are few ways to produce visuals from 1-2-3. PC Presents! fills a gap, but as the dentist says, it's only a temporary filling.



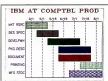
Executive Presentation Kit

The Best of Both Worlds

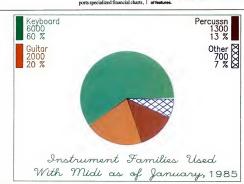
E

xecutive Presentation Kit takes the power of business graphics and adds some artistic pitzazz to give you the best of both worlds. It offers more than 30 chart types plus an extensive set of customizing options. The EP Kit also features customized drawings and screen slide shows with appealing special effects. An added bonus is that it is one of the easiest graphics packages to use.

Unlike the limited charting options of most presentation graphics packages, EP Kit supports specialized financial charts,



EP Kit can enhance bar and pie charts with a wide various of features.



tive Presentation Kit Koala Technologies Corp. 3100 Patrick Henry Dr. Santa Clara, CA 95052-8100 (408) 986-8866

CIRCLE 673 ON READER SERVICE CARD LIST PRICE: \$299.95; \$399.95 with Koule **Touch Tablet**

REQUIRES: 192K RAM, two disk drives

SUPPORTS: Video boards-IBM Colon/Graphics

Printers-IBM Graphics; Epson FX, JX, RX; m Quadiet: Radio Shack CGP-20: on A-1210: NEC 8023: Hewlett-Parkard ThinkJet; C. Itoh 8510A, 8510 SCP

ers-Hewlett-Packard 7220C, 7220T, 7470. 7475; Epson HI-80; Houston Instruments DMP series

DOS versions-2.0, 2.1, 3.0 Other operating systems—none DOCUMENTATION:

Tutorial-ptp COPY PROTECTION: nep GENERAL GRAPHICS FACILITIES: pcf.

ped, mda SCREEN GRAPHICS FACILITIES: ssh.

asd, med

SCREEN/PRINTER/PLOTTER FACILITIES: Heaching mht Color choice-mcc Legends-aci

Header lines-1 Comment lines-not Note lines-none Comment positio Type fonts-10 Type font sizes-10 Chart overlays-none Axis scaling-eas, mas

Grid display-mgd Tick precision-atp, mtp Page adjustment-pps, hvs., psa

Sources-ikb, ims, ipt, iff Graphics formats-none Standard formats-ASCII, DIF

CHART TYPES: Column charts-9 cls, 9 cgs, 6 cgp, 6 ssc, aoc, 3dc, nvc

Bar charts-to Line charts-6 lns, 63 ppl, 5 tpl, 6 lsm, utl, usm, fil, spl

Pie charts-12 psl, 12 eps, 3 dp, epv, uap Text/word charts-10 fpc, 6 bts Gantt charts-10 ite, 10 roe, ute, 6 sme Organization charts-(user drawn), 6 sto, vso Bubble charts-non High-low charts-63 ihl, 3 shl, 3 uhl Surface-area charts-6 ins, 63 pls

such as breakeven, ratio, sensitivity, and high-low, as well as find PERT charts, histograms, and accounting graphs (balance sheets). In addition, the program handles data better than the average presentation graphics package. Line graphs, for example, can display six lines with 63 data points each. And you can easily transfer data from other programs, including spreadsheets and database files. However, if you must enter data from the keyboard, EP Kit provides you with a spreadsheet

Mega Menus

format to make your job easier.

The program is organized with a main menu of seven selections displayed across the top of the screen: Toolbox, File, Data, Gallery, Format, Text, and Draw. Each main choice brings up a submenu of choices that "pop down" beneath the main selection. To create a graph, you follow a three-step procedure. You identify the data file, specify which data from the file is to be graphed, and then select a chart type for displaying the data. To select a chart type, you choose the Gallery option from the main menu. If you choose a bar graph from the submenu, yet another submenu pops down to let you decide on such formatting features as two-dimensional versus three-dimensional and stacked versus overlapping bars.

EP Kit's chart enhancement abilities set it apart from many standard business graphics packages. Once you create a chart, you can enhance it in a number of ways. For instance, the Text option allows you to place horizontal or vertical titles in ten fonts, four colors, and at six slants. If you want more enhancement options, you pick the Draw option; it gives you all of those drawing tools found in most presentation graphics packages, including boxes, circles, frames, lines, color changes, diamonds, and arrows. You can also sequence your enhanced charts in a slideshow presentation that gives you even more options, like dissolves and curtains between slides

All of the charts that you create can be saved without the data as format files. That means, for example, that once you get a pie chart to look just the way it should, you can store it and use it again later by reusing input as needed. Eventually, you will build up a library of commonly used formats that may save you a lot of time in creating new graphs.

Minimal Typing

A major plus for EP Kit is that it is easy to use. First, EP Kit requires minimal typing if you transfer data from a spreadsheet. The pull-down menus make it easy for you to see all the possible choices at a glance. In addition, because it works with the KT-2010 touch tablet, you can make menu selections by moving a stylus or your finger around the 4- by 4-inch drawing surface that is mapped to the screen display. You simply point to your choice and press a button on the tablet. (The program also works with a variety of other graphics input devices.) EP Kit's menus are so helpful

> Executive Presentation Kit's chart enhancement abilities set it apart from many standard business graphics packages.

that it is unlikely that you will get confused or stuck. If one choice doesn't do what you expect, you can select another menu item and move on.

The manual is as clear and easy to use as the program. An entire section gives examples of the chart types and explains why and how you use each one. Its helpful tutorial gets you started, but it could be more extensive. The only major flaws in an otherwise well-designed manual are the lack of an index and a misprint in the information for setting up a printer. A call to the company was needed to get the program to output to the test plotter. Otherwise, the manual was helpful and accurate.

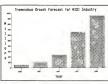
Executive Presentation Kit may be just the tool kit you're looking for because it combines business graphics and presentation graphics in one package. In fact, it's hard to beat if you need specialized charts that can be dressed up for an audience on a moment's notice.

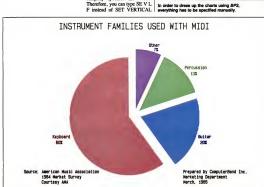


BPS Business Graphics

Flexible Graphic Language

PS Business Graphics is a program that requires a large investment of time for its output. Like GrafTalk and a number of other graphics programs, it is based on a free-form language concept that you must learn. In BPS, as in DOS, you modify verbs or commands with a series of adverbs, switches, and parameters. You can abbreviate most words in the command sentence with any short sequence of characters that uniquely specifies the words.





BPS Business Graphics 2.61 Business & Professional Software Inc. 143 Binney Street Cambridge, MA 02142 (617) 491-3377

CIRCLE 698 ON READER SERVICE CARD

LABEL FREQUENCY.

BPS has some nice features that set it apart from other packages. It offers extensive business, analysis, and math functions as well as other advanced features that permit manipulations not normally included in a graphics package. Such commands as DISTRIBUTE (to create new data sets). FIT (to fit constant, exponential, line, logarithm, or parabola curves), and SMOOTH (for curve smoothing) produce useful graphs not available with some other packages.

BPS is not copy-proteted, and so you can easily copy it onto two floopy disks or any hard disk. It requires a standard IBM-

type color adapter.

BPS accommodates an unusually large number of output peripherals, including plotters, dot matrix printers, and daisywheel printers. The installation of your hard-copy output device is mainly done from within BPS itself. The BPS manual devotes nearly 100 pages to the idiosyncrasies of hard-copy devices, including cabling and switch requirements. Many graphics programs do not use many of the special built-in abilities of plotters and printers, but BPS actually depends on them. For example, the program only supports outlined or solid-filled bars. Hatched bars are only available if the plotter or printer has this ability in its repertoire.

You enter data via an on-screen editing mechanism that has its own set of commands to manipulate data. You key information as data pairs; BPS makes no direct provision for entering tables of numbers, but an unusually flexible interchange system allows you to import tables directly from Microsoft Multiplan SYLK files or from any program that produces standard ASCII print files.

Once data is available, you can easily draw primitive graphs with only a command or two. You use the basic command DRAW to produce an image and use such modifiers as AREA, AXES, HORIZON-TAL BAR, VERTICAL BAR, CURVE, MARKS, POINTS, and PIE to determine the type of the graph.

BPS has an editor to create and edit command "Take" files containing sequences of BPS commands. The editor is adequate, but you probably won't want to use it as your main editor.

It's fairly easy to get a simple graph on the screen with BPS, but hard to dress up the charts because you have to specify almost everything manually. For example, the program offers no commands to automatically add percentages to pies, add notes or comments, or display numeric data values adjacent to bars. You have to position blocks of text on the chart.

Manual Labor Problems

Many problems crop up when you have to position text manually. In BPS's screen representation, plotted output isn't matched very well, but, then, other graphics programs have similar on-screen restrictions. More seriously, it takes a lot of time and hard work to produce a basic pie chart on the screen and position the percentages and comment blocks. BPS ameliorates this problem slightly by displaying the x and y coordinates at the exact location that you selected with the arrow keys, so that you can enter the exact coordinates into a Take file for future use.

Incredibly, however, you can't use these coordinates for hard-copy output. BPS doesn't recognize the plotter keys. To determine the correct coordinates, you have to experiment with numerous plotsa slow, time-consuming process.

After you correctly position the text, BPS does not fill in solid-color areas well. nor does it let you adjust the increments used by the plotter to fill in an area. The program has no built-in fonts; it depends on the fonts provided by the plotter.

The BPS documentation, unlike the program, deserves special praise. It is very clearly written and, for the most part, is easy to understand. A good tutorial and on-disk demonstration gets you started quickly, and examples illustrate how to

put the program through its paces. Overall, BPS seems to be much ado about not so much. Rather than having predefined formats for you to plug data into, BPS requires you to learn an extensive set of commands and parameters to produce even simple charts. The program can produce reasonable charts, but so can many other programs that make fewer demands. BPS is certainly not a bad product, but the time it takes to learn the system is not amply repaid by the quality or scope of what the program produces.

LIST PRICE: \$350 REQUIRES: 128K RAM, two disk drives

Video boards-IBM Color/Graphics Printers-IBM Graphics, Apple Dot Matrix, Letter Quality; C. Itoh 1550, 8510A; Centronics 122, 352, 353; Diablo 630, 1600 series; Epson MX, FX; IDS Prism; Mannesmann Tally, NEC Spinwriter, Okidata Microline: Ourne Spri

Pioners-Amdek DXY100, Amplot-II; Apple Color; Calcomp M84; Hewlett-Packard 7220, 7221, 7225, 7470, 7475; Houston Instruments DMP3, DMP4, DMP6, DMP7, DMP29, DMP40; IBM XY/749, XY/750; Panasonic VP-6801P: Mannesmann Talley Pixy1, Pixy2; Strobe 100; Sweet-P; Watanabe WX 4633, 4634, 4635, 4636, 4637, 4638, 4671 4675

DOS versions-1,0 through 3.0 Other operating systems-UCSD

DOCUMENTATION:

Tutorial-ptu Manual-gtm, idx, tcs,

COPY PROTECTION: hds GENERAL GRAPHICS FACILITIES: mds SCREEN GRAPHICS FACILITIES: ssh.

SCREEN/PRINTER/PLOTTER

FACILITIES: Hatching-mht, nht Color choice-acc mod Legends-mcl,vlp Header lines-1 Comment lines-none Note lines-none Comment position-yep

Type fonts-fonts Type font sizes-hardware-dependent Chart overlays-none

Axis scaling-aas, mas Grid display-mgd Tick precision-mtp Page adjustment-psa

INPUTS: Sources-ikb

Graphics formats-none Standard formsts-SYLK, ASCII CHART TYPES:

Column charts-4,096 cls; egs, epg, ssc unlimited; noc; npc Bar charts-4,096; bgs, bpg, ssb unlimited; nob; npl Line charts-Ins unlimited, 4,096 total ppl,

5 tpl, Ism depends on hardware, utl, usm, spl, rcl, rdl Regression types-constant, exponential, linear, log, parabolic, sine

Pie charts-4,096 psl Text/word charts-fpc depends on hardware Gantt charts-none Organization charts-none Bubble charts-none

Surface-area charts-lns unlimited, 4,096 total pls



Graf Talk

A Venerable Package That Stands Up Well

rafTalk is a truly venerable graphics package: it's been around in virtually the same form since the days of the 8-bit micros running at 2 MHz. GrafTalk was great when it was all that was available, but how does it stand up in today's business graphics field-a field crowded with heavyweight newcomer competition?

> The answer is, "Ouite well, thank you." GrafTalk continues to offer impressive flexibility and performance, although it is still not particularly well suited for beginners or users unwilling to make some commitment to learning its command language.

Graftalk is both flexible and restrictive in its data-handling capabilities. Data can be typed at the keyboard or retrieved from a simple tabular ASCII disk file. but GrafTalk can't import or export data from DIF, or other common microcomputer data-interchange formats. Once you import your data, however, you can use Graffalk's excellent spreadsheetlike scheme for manipulating charts; you name rows and columns, perform simple arithmetic, and create and delete new rows and columns.

Once data is available, GrafTalk's powerful commands can be used directly from the keyboard or from its built-in fullscreen editor, called SCATE. You gain real advantages by running GrafTalk from SCATE. You can save the command sequences you produce with it to disk so that you can run GrafTalk from these files later. SCATE maintains as many workspace areas as needed, each containing separate programs for separate charts.

SCATE makes good use of control characters and two-letter sequences to trigger its functions, which include find, replace, file manipulations, and even file comparisons. SCATE has a few peculiarities, such as a separate mode just for adding blank lines, and it requires you to learn a new set of commands. But it does make a

big difference in how GrafTalk works. GrafTalk doesn't contain any predefined graph formats like those of many other programs. But its commands produce

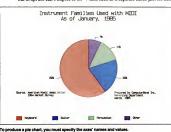
charts fairly easily. GrafTalk can produce all the standard charts: pie, bar, column, line, and scatter. The newest version (3.27) includes commands for creating bubble and surfacearea charts and charts with dual y axes. A "slide show" feature also appears in the newest version. With this new feature, GrafTalk saves charts to disk in image form that can be displayed rapidly; you control the display manually or put in specified pauses between slides for an automatic slide show. Commands are included to build custom menus for special applications. These commands form a primitive PILOT-like language for adding intelligence to a simple menu system.

Giving You a Free Hand

GrafTalk includes a freehand sketching mechanism, but it's rather clumsy to use in its present form. The manufacturer claims that more-advanced chart types, such as Gantt, organization, and high-low, can be created from these available tools. The program can produce some complicated charts, but it requires fancy fingerwork.

Once you specify a standard chart, providing the information GrafTalk needs to produce it is usually straightforward. Various commands control such aspects of chart production as color, axis scaling, and grid display. GrafTalk uses sensible default values for some of these characteristics, but, in other cases, you must be specific or nothing will appear.

For instance, you must specify the names of the axes and the values for the xaxis tick points and pie segments since GrafTalk can't read labels or legends from a data file. Nor can GrafTalk produce any fancy text manipulations.



Graf Talk 3.27 Redding Group, Inc. 109 Danbury Road Ridgefield, CT 06877 (800) 435-7744 (203) 431-4661

CIRCLE 697 ON READER SERVICE CARD

LIST PRICE: \$450 REQUIRES: 128K RAM, one disk drive

received years ago. It should be seen that the second in demonstrating the advanced features of the program. The program also of-

Phantronics
Printers—Diablo 1650, 1640, 630; Tektronix
4695; Anadex 9500; Dataproducts P80, P132,
SFG-8050, 460 Paper Tiger; DEC LASO,
LA100; Epson MX, FX; Epijsto DMP9,
DMP24; IBM Graphics; Okidata Microline;
MP PrintMate 99G, 150

Pioters-Houston Instruments DMP29; Calcomp 81, 84; Panasonic VP6861; Hewlett Packard 7470A, 7550; Goertz 281, 184; Amdek II; IBM XY/749, XY/750; Mannesmann Tally Pixy 3

DOS versions-1.0-3.0
Other operating systems-CP/M

DOCUMENTATION:

COPY PROTECTION: ncp

GENERAL GRAPHICS FACILITIES: 1000 SCREEN GRAPHICS FACILITIES: 15th, 15td, mid

SCREEN/PRINTER/PLOTTER FACILITIES: Hatching-aht, mht

Color choice-ace, mcc Legends-mcl, vlp Header lines-80 chars mas Comment tines-unlimited Note lines-unlimited Comment position-vcp Type fonts-1 Type fonts-1 Type fonts-1

Chart overlays—unlimited Axis scaling—aas, mas Grid display—mgd Tick precision—atp, mtp

Page adjustment-ppa, hva, psa INPUTS:

Sources-ikb Graphics formats-none Standard formats-ASC

Standard formati-ASCII
CHART TYPES:

Column charts-4096 cis, cgs unlimited, cpg unlimited, sec unlimited, noc

unlimited, ssc unlimited, noc Bar charts-4096 brs, bgs unlimited, bpg

Bar charts-40% brs, bgs unlimited, bpg unlimited, ssb unlimited, nob Line charts-lns unlimited, ppt unlimited, 8 tpl,

Line charts—Ins unlimited, ppl unlimited, 8 to 128, utl, usm, spl Regression types—none Pie charts—pel unlimited, eps unlimited, pov

Text/word charts-1 fpc
Gant charts-itg unlimited, rog unlimited,
utg, 1 smg

organization charts-smo unlimited, clo unlimited, tlo unlimited

Bubble charts-bbs unlimited, cpb unlimited, lib, lob, lib High-low charts-ihl unlimited, shl unlimited Surface-charts-ins unlimited, pls

automatic program-generated positioning of chart elements of contral elements is graphic output to he display screen, suitable printers or plotters, or to disk images. Unfortunately, the finished output is of good quality. Redding

you're inemee tower programming. Command response is very qualt, and the finished output is of good quality. Redding marked Gorpfalds. "I me an "And Gorpfald is interactive in the enne that a BA-SIC interpreter is more interactive than compiler. But it is less interactive that a compiler. But it is less interactive than a compiler. But it is less interactive than programs that allow on-serven manipulon of chart elements. A lot of people like Gorffald wery much, and its following would be even wider if some of the rough edges were smoothed out.

released years ago: It still doesn't go far

GrafTalk's documentation is weak and

disorganized and doesn't provide any ex-

amples of how to create charts other than

the rudimentary ones in the beginner's tu-

torial. While the manual does have an in-

dex, the book's basic organization is poor.

However, a rather primitive on-line help

is that the manual does not always reflect

the version of the software. For example,

GrafTalk requires a special pin connection

in the cable to the Hewlett-Packard 7475

plotter, but my manual didn't even discuss

A more serious problem with GrafTalk

system is included with the program.

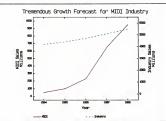
fers a menu system for novices.

While GrafTalk lacks many of the capabilities built into newer graphics programs, you can work around these limitations using the program's joystick command. For example, there is no provision for adding notes or comments to a chart per se, but blocks of text can be positioned manually using JOYSTICK. This command allows you to position the cursor on the screen to indicate where the next text, legend, or similar insertion will take place. GrafTalk has a related command that translates the cursor's "iovsticked" position into x and v coordinates. The joystick command is also available during plotting by using the pen-positioning keys found on most plotters. However, JOY-STICK is not always a replacement for automatic program-generated positioning

Graffalk can route its graphic output to the display screen, suitable printers or plotters, or to disk images. Unfortunately, the screen representation doesn't look very much like plotted hard copy. A few slow replottings are usually required to get evcrything just so. But what Graffalk does ot, it does well. Its plotting speed is good, and the shading, precision, and other stylistic treatments of the charts are well

done.

GrafTalk's manual includes a tutorial that is essentially unchanged from the one



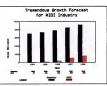
The program can produce some complicated charts, but it requires fancy footwork.



Boardroom Graphics

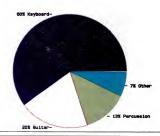
A Fast But Rigid Track to the Plotter

confrom Graphics produces attractive plotted graphs, but its on-screen and printer displays are not great. To use the program, you must follow a rigid format, but this rigidity is precipated by the state of the procipate of the product of the procipated in the product of the prosequent products of the prosequent products and the subpleted in the properties when the products of the prosequent products of the prosequent procession of the prosequent products of the prowith these quirts, you'll probably like Boardroom Graphics.



Boardroom Graphics features a full spectrum of preformatted business graphs and charts.

Instrument Families Used with MIDI



Beardroom Graphics 3.0 Analytical Software, Inc. 10939 McCree Rd Dallas, TX 75238 (214) 340-2564

CIRCLE 681 ON READER SERVICE CARD

LIST PRICE: \$150, plus \$50 for options printer support REQUIRES: 128K RAM, one disk drive

SUPPORTS: Video boards-IBM Color/Graphics nters-IBM or Epson (o

Piotters-Hewlett-Packard 7470A, 7475A DOS versions-2.0, 2.1 Other operating systems-none DOCUMENTATION: Tusorial ptu

COPY PROTECTION: no GENERAL GRAPHICS FACILITIES: ped SCREEN GRAPHICS FACILITIES: ssh.

SCREEN/PRINTER/PLOTTER FACILITIES:

Hatching-mbt Color choice-mcc Legends-acl, nor Hender lines-2 Comment lines-0 Note lines-0 Comment position-r Type fonts-1 Type font sizes-1 Chart overlays-1 Axis scaling-aas Grid display-med

Tick precision-atp Page adjustment-none INPUTS: Graphics formats-none

indard form ats-ASCII, DIF CHART TYPES

Column charts-12 cls. 3 ces. 12 cpg, acc. 3dc Bar charts-none Line charts-5 lns, 60 ppl, 5 lns, spl, rdi gression types-li Pie charts-5 psl, ppl Text/word charts-1 frc. itx

Gantt charts-none Organization charts-none ble charts-none High-low charts-none urface-area charts-5 lms, 60 pls

especially if you'll be relying only on plotted output.

Boardroom Graphics creates a full spectrum of graphs and charts, including regressions, trend lines, text, and 3-D color graphics, and you can output any of these charts to the screen, a plotter or printer, or transparencies. It features many niceties, such as preformatted periods of daily, monthly, and annual variables and data that can be input as a constant or a fixed rate. Boardroom Graphics accepts data from many sources, including DIF, SYLK, and BASIC.

Manual Slide Shows

A series of menu-driven prompts allows you to easily enter data and select graph attributes. As you create individual charts. Boardroom Graphics organizes them into units of ten, called cases. You create, retrieve, and display all graphs by summoning a case name. The bright side to this nontraditional organization is that it allows you to group charts as a slide show presentation. But, the case organization doesn't allow you to select just one or two individual charts for a presentation-you must have ten slides, not more or less. If you don't enter any data for a chart within a case, then the program displays an empty grid. There's nothing automatic about Boardroom Graphics's highly touted slide show. You have to repeatedly hit a keyboard key to keep the presentation moving along.

To save a graph, you have to specify a filename. The program also maintains its own unique name for your files; it uses a suitably ambiguous one, such as DATA123. To recall a file you can use your filename, but to duplicate or delete a file you have to use the program's name for it. Inevitably, because of this duplicate naming process, you wind up with an unintelligible and very full DOS directory.

The program is written in compiled BASIC and it invokes different modules through the chain option. Modules do not share data, and the program doesn't alert you when it calls a new module. It is easy to lose your data unless you are especially careful about saving at every opportunity. Other comparable programs will maintain your data inputs as necessary. It's unfortunate that the program's on-

screen graphic display is very poor, espe-

cially since one of its featured attractions is its slide show capability. Because the screen display is poor, the screen dump to the printer is equally disappointing. After all this mediocre output, however, the plotter graphs shine. They are so impressive, in fact, that it is difficult to believe that the same program that produces such uninspiring screen output can plot so well.

Sloppy Inconsistencies

The Boardroom Graphics tutorial is clear and well arranged, and its documentation is very succinct. Although relatively harmless, I found sloppy inconsistencies between the documentation and the program itself. For instance, the manual uses the word palette where the program uses the word color, and a chart in the manual is called a graph in the program. It's as if the two were written in mutually exclusive environments. Also, the documentation has no index or glossary. The table of contents is built around lessons and not con-

> It is difficult to believe that the same program that produces such uninspiring screen output can plot so well.

tent, so it's almost impossible to find information without perusing the manual.

The program is a copy-protected nightmare. You can't make backup copies, but you can obtain a copy for \$5 from the manufacturer. Twice, for no apparent reason, Boardroom Graphics displayed a message proclaiming a "violation of agreements with Analytical Software," after which the program returned to the operating system. The program was obviously attempting to check if the disk was an original or a copy, even though it was the real McCoy.

Will you be bored with Boardroom Graphics? It all depends. If you like your graphs quick and easy and you rely on plotted output, you might be happy with this program, despite its faults.

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| BT6Plus | 50.00 | 5.00 |
| HR 39 and HR 134 | 50.00 | NA |
| HR31 200 | 95.00 | NA |

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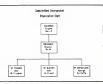


PC-Draw

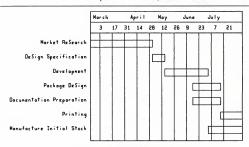
Quick on the Draw

A

s its name implies, PC-Draw is a drawing program. Although it supplies templates and other tools for creating business graphics, it is not a charting program. It will not let you enter a few numbers and sit back while it generates a chart for you. You can use the program to draw standard business charts, but this is not what PC-Draw does best. Much more appropriate uses include drafting electronic schematics, flowcharts, organizational charts, and even architectural floor plans.



PC-Draw comes with several on-disk predefined templates for charts and text fonts.



Prepared by ComputerBand Inc. Marketing Department March, 1985 IBM AT-Compatible Products Being Developed

PC-Draw L4 Micrografx, Inc. 1701 N. Greenville, Su Richardson, TX 75081

(214) 234-1769 CIRCLE 688 ON READER SERVICE CARD

LIST PRICE: \$395 REQUIRES: 128K RAM. (256K

recommended), one disk drive
SUPPORTS:
Video boards-IBM Color/Graphics or
compatible, Paradise Modular Graphics.
Printers. Procor MX FX-TRM Graphics. C

compatible, Paradise Modular Graphics
Printers-Epson MX, FX, IBM Graphics, Color,
Gemini 10, 15; Okidata M84, M92, M93,
NEC 8023; Mannesmann Talley; C. Inob; IDS
Prism

Piotters-Hewlett-Packard 7470A, 7475A, 7550A; Houston Instruments DMP40, DMP29 DOS vertions-2.0, 2.1, 3.0

Other operating systems—none DOCUMENTATION: Tutorial—stu, ptu

Manual-gam, idx, tes COPY PROTECTION: hdk GENERAL GRAPHICS FACILITIES: mda

SCREEN GRAPHICS FACILITIES: none SCREEN/PRINTER/PLOTTER FACILITIES:

Hatching-none
Color choice-acc, moc
Legends-mcl, vlp
Header lines-unspecified
Comment lines-unspecified
Note lines-unspecified
Comment position-vcp
Type fonts-6
Type font sizes-no limit
Chart overlays-none

Axis scaling-nas Grid display-ngd Tick precision-ntp Page adjustment-hva, psa

INPUTS: Sources-ikb Graphics formats-no

Standard formats—none
PROGRAM CHARACTERISTICS

Design method-fiel, sid
User interface-10 mop, 44 top, trea
Type font & itsue-6 first, firs unspecified, 6 firy
Pattern handling-none
Drawing tools-cop, idr
Predefined charts & images-none
Other business chart formats-none
Image libraries-8 dept.

The program comes with several predefined templates on disk. These fall into two categories: graphics templates, each of which is appropriate to a given application, and predefined text fonts. Each template can hold a maximum of 105 symhols.

DOS.
The predefined templates include symbols for flow charts, data flow diagraming, electrical design, floro plans, miscellancous symbols, and four text fonts. You can also create as many additional templates as you need containing either symbols or ext forts. The number of the symbols or ext forts. The number of the plates available to you is limited only by how many filtse can fit on your disk. While working on a drawing, you can load templates from disk, changing them as often

as necessary. Using the symbol-based templates is reasonably simple. First, you load the appropriate template into memory. Each template contains a maximum of 105 symbols, 21 of which can be displayed on the screen at any one time. You then page through the template until you see the symbol you want and choose it by number-1 through 105. The symbol shows up at the cursor location, after which you can move it around the screen, enlarging or shrinking it as necessary. A nice touch is that you can move the symbol over other text or symbols that are already on-screen. This will momentarily disturb the background symbols, but you can restore them with a single keystroke.

Using the text templates is also straightforward—simply load the appropriate text template into memory, and you can toggle it on or off at will. In addition to the template-based text fonts, two other text fonts are available at all times—the ROM-based IBM text font and an internal text font in the program.

PC-Draw supports a variety of printers and potents. However, there can often be and potents. However, there can often be a discrepancy between what you see on the discrepancy between what you see on the scener and what is actually plonted. Plotting a Gantt chart for PC Magazine's testing a proved to be difficult. The fill corntained, used to create solid bass for the chart on the scene, was not conveyed to the plotting and consequently the bars were not filled in Apprently this happened because PC-Draw retained unwanted lines that were happened to the processing the property of the provided to the process of the provided to the pr

show up on the screen.

Another problem arose when lines that appeared properly connected on the screen did not turn out to be properly connected in the printed output—for example, connecting lines in an organizational chart. In the tests these lines unexpectedly crossed each other or left gaps. The problem was that the plotter's resolution was higher than the screen's, so lines often fooked fine on the screen's, so lines often fooked fine on the contract of the plotter. When the test of the plotter's resolution was not problem was that to be plotted from the plotter. When the top to be plotter when the test of the plotter's plotter is the plotter's plotter in the plotter

PC-Draw is command-driven; most commands are triggered by pressing Alt in combination with some other key. Unfortunately, the command-key letters do not naturally suggest their functions. For example, to delete an object or move it somewhere else, you first define the object or section by marking its upper left- and lower right-hand corners. The command for markine is Alt-ampersand (&c), hardly

PC-Draw is command-driven. Unfortunately, the command-key letters do not naturally suggest their functions.

an obvious mnemonic. Even worse, the name of this command is "block symbol select"—which makes it hard to find in the index if you assume it might be called "cut and paste" or "move symbol." Of course, given enough time, you will eventually learn these commands but don't expect to do so immediately.

On the whole, PC-Draw is a useful program for rendering sophisticated charts or specialized drawings. Moreover, the template library offers a wide selection of images that can be used for a variety of applications; these alone can make the package worth its price. But for standard business graphics or infrequent or casual use, it has too many details that are hard to remember.



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BUSINESS GRAPHICS

CHART-MASTER

An Old Reliable Shows Flexibility and Competence

HART-MASTER is an old-reliable package that has been

around a while and has collected a loyal following. It produces bar and column charts, with clustered and stacked variations, as well as line, scatter, area, pie, and high-low charts, but not text/word charts. (SIGN-MAS-TER, a related program, fills this function.) CHART-MASTER's installa-

tion is straightforward. The copy-protection scheme prevents you from making any floppy copies, and you must have the

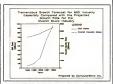
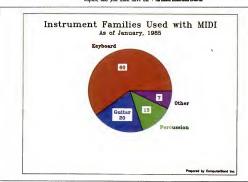


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BUSINESS GRAPHICS

master disk in drive A: to start the program from a hard disk. A menu-driven utility solicits all the required information about your system's configuration and peripherals. CHART-MASTER supports the Hercules monochrome graphics card, the Polaroid Palette, and an impressive list of

plotters and printers. While it is not necessary to view a chart before printing or plotting it, CHART-MASTER allows you to preview the chart layout on-screen; this feature makes the

program seem more interactive. The menu structure is clear and easy to understand, but somewhat primitive. CHART-MASTER does not use the more helpful technique of highlighting the currently selected menu option and guessing the option that you are likely to want next.

Entering Data Data entry can come from only the keyboard or DIF files: the program offers no provisions for reading normal ASCII files or those following any other interchange standards. It's rather awkward to import DIF files from 1-2-3: you have to write to a DIF file, reload, resave to DIF format within 1-2-3, and then finally load into CHART-MASTER, Instead of going through this complex process, Decision Resources suggests you rekey the data unless you have a large amount of information to import.

Because the program's prompts are straightforward, you can quickly enter data and specify chart information. You can check input and document charts with CHART-MASTER's Chart Verification, which is a useful feature that lists the input data and chart specifications on the screen or printer

CHART-MASTER allows for some nice enhancements to the basic charts. You can put several pie charts on a single page and scale their sizes to show their proportional relationships. It's also possible to prepare dual-axis charts and place data values near points on a line or adjacent to bars or columns. CHART-MASTER can also perform five types of regressions on your data.

Limitations

CHART-MASTER has some definite limitations, however. You cannot override the program's decisions on the placement

of elements on the chart (which explains the somewhat odd appearance of the test pie chart). It would also be helpful if

CHART-MASTER allowed for the insertion of comments or notes beyond a oneline footnote.

The program permits unusually complete control over the plotting process. Using the PC's cursor keys, you can specify the exact size of the plot-a useful function for preparing masters for overhead transparencies and slides or for special applications. You can also position several small plots on a page, determining each one's orientation. CHART-MASTER lets you change the pen speed-if your plotter allows-to compensate for media characteristics.

One limitation in plotting is CHART-MASTER's provision for floating legends, which is close to unusable if your plotter and PC aren't immediately adjacent; it's nearly impossible to monitor the pen positions and hit the cursor keys at the same time unless you have stretchable arms like Gumby's. Moreover, using the PC's cursor keys, you can position the plotter pen to insert legends in an available area, but it's not easy to envision the placement of the legend on the finished chart.

Snail-like Plotting It's a good thing CHART-MASTER produces high-quality plots because its plotting speed is incredibly slow. Some of the sample plots took 15 or 20 minutes to complete, even with the fast HP-7475 plotter. The program does a very thorough job of filling in solid areas, making many passes with a fine increment between each pass, but this task doesn't seem to be the reason for the snail-like plotting. Instead, the slow pace seems to result from the fact that CHART-MASTER is written in compiled BASIC. It may take you a while to warm up to

CHART-MASTER; its somewhat rough user interface and daisywheel-printed documentation can be a bit off-putting. However, if you don't easily give up, you will eventually see the reasons why the program has gathered so many fans over the years.

CHART-MASTER certainly has many flaws and omissions, but its good points are quite tangible, too.

CHART-MASTER 6.05 Decision Resources 25 Sylvan Road Westport, CT 06880

(203) 222-1974 CIPICLE 691 ON READER SERVICE CARD

LIST PRICE: \$375 REQUIRES: 192K RAM, two disk drives

STEPPORTS. Video boards-IBM Color/Graphics, Hercules

Printers-IBM Graphics, Color, Epson MX, RX,

FX; Datasouth DS 180; Dataproducts P-Series; IDS Prism 80, 132 Piotters-Amdek Amplot II; Apple; Calcon M84; Gould DS7, DS10; Hewlett-Packard 7220 B/C/S/T, 7225, 7470A, 7475A, 7550; Hitachi 671-10, 671-20; IBM XY/749,

XY/750, 7371A, 7372A; Houston ments DMP29, DMP40, DMP41, DMP42; C. Itoh CX-4800; Mannesmann Talley Pixy 3; Sweet-P 100; Roland DXY800: Panasonic VP-6801; Strobe 100,

DOS versions-1.1, 2.0, 2.1, 3.0

Other operating systems-none DOCUMENTATION

Tutorial-ptu Manual-idx, to

COPY PROTECTION: bdk

GENERAL GRAPHICS FACILITIES: pcf ped, mda

SCREEN GRAPHICS FACILITIES: none

SCREEN/PRINTER/PLOTTER **FACILITIES** Hatching-aht, mh

Color choice-acc, mcc Legends-acl, mcl, vlp Header lines-4 Comment lines-1 Note lines-none

Comment posit Type fones 6 Type font sizes-16

Chart overlays-none Axis scaling-aas, mas Grid display-mgd (horizontal only) Tick precision-atp (y axis only)

Page adjustment-pps, hva, psa INPUTS:

Sources-ikb

Graphics for Standard formats-ASCII, DIF CHART TYPES:

Column charts-24 cls, 24 cgs, 24 cpg, 24 ssc,

Bar charts-24 brs., 24 bgs., 24 bpg., 24 ssb, nvb Line charts-24 lns, 60 ppl, 8 tpl, 8 lsm, utl, usm, sll, spl, rel, rdi

Regression types-linear, logarithmic, sponential, power, moving average Pie charts-20 psl, 20 eps, ppv, apv, epv Text/word charts-no Gantt charts-none

Organization charts-none Bubble charts-not High-low charts-24 ibl. 8 shl. 8 uhl Surface-area charts-24 lns, 600 pls

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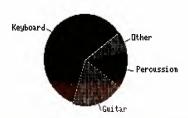
7

ebra Business Graphics is CompuVision's short-necked, scaleddown counterpart to its Giraph Business Graphics program. The Zebra manual proclaims that the program is identical to its Giraph cousin except for its lack of plotter support. In reality, however. a few bugs that escaped Giraph crept under Zebra's hide. Even though Zebra's graphs are sophisticated in composition, the printed output is weak, the program is periodically inconsistent, and the documentation is careless. But bugs and all, Zebra still | impressive visual impact.



Zebra gives users sufficient tools to create graphs with impressive visual impact

Instrument Families Used with MIDI As of January, 1985



Zebra Business Graphics 4.5 CompuVision 70 Greenwich Avenue Saite 169 New York, NY 10011 (212) 620-8134

CROLE 686 ON READER SERVICE CARD

LIST PRICE: \$45 REQUIRES: 192K, one disk drive

Video boards-any color/graphics (not Henryles)

Hercules)
Printers-Epson and compatibles

Printers-Epson and compatibles Plotters-none DOS versions-2.0, 2.1

Other operating systems—none DOCUMENTATION:

Tutorial-ptu Manual-tcs

COPY PROTECTION: ncp GENERAL GRAPHICS FACILITIES: pcf pcd, mda

SCREEN GRAPHICS FACILITIES: sub, ssh, msd

SCREEN/PRINTER/PLOTTER FACILITIES:

Hatching-mht
Color choice-mcc
Legends-mcl, vip
Header tines-3
Comment lines-none

Note lines—none
Comment position—none
Type fonts—3
Type font sizes—3

Type font sizes-3 Chart overlays-2 Axis scaling-mas Grid display-mgd Tick precision-mtp

Page adjustment no INPUTSt Sources-likh

Graphics formats-none Standard formats-ASCII, DIF, SYLK

Standard formats-ASCII, DIF, SYL
CHART TYPES:

Column charts-cls unspecified, 12 cgs, 60 cpg, 12 ssc, noc, 3dc But charts-bys unspecified, 12 bes, 60 box

Bar charts-brs unspecified, 12 bgs, 60 bpg, 12 ssb, nob, 3db Line charts-12 lns, 60 ppl, 3 tpl, 1 lsm, utl, usm

Line charts-12 ins, 60 ppl, 3 tpl, 1 ism, utl, sll, fll, spl Regression types-none Pie charts-12 psl, 12 eps, epv, uap

Text/word charts—3 fpc, cxx, jxx, bxx, utx Gant charts—none Organization charts—none Bubble charts—none High-low charts—4 ihl Surface—anc charts—12 lns, 60 pls

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Maximum Visual Impact

The program can handle a respectable 20 variables, with 60 data points cach. An advanced feature lets you combine two graphs on the same chart using separate right- and left-axis scaling. Every feature has built-in default selections to speed along the process of graph construction. Axis scales can be sell insulty, logarithmically, or manually. You can inbed an axis with performanted variables like days, weeks, months, and years. With 11 graph with the process of the

Like Giraph, Zebra allows you to crete customized, text-only graphs using a fill-in-the-chart" routine in which you cify text size, color, justification, and

> cries of graphs can be displayed as a own on the monitor or submitted as a be to the printer. Side shows can be leading to three dumi-reserved the control of three dumi-reserved the control of the pains

nearly as good as you would expect. Strangely enough, it deteriorates from the screen image. Zebra supports only Epson and Epson-compatible printers.

Bugs in the program force the user to experiment with print after print to achieve satisfactory results. A sample pie chart displayed better output from a medium-resolution color screen dump than the high-resolution black-and-white dump. The high-resolution dump actually graphed the pie sections incorrectly. All four prints displayed thin, weak text and fill areas, composed of murky little dashes rather than dark, filled, closed areas. The weakness is most evident in titles and data labels. where large text gets so jagged-looking that it becomes difficult to read. The output is probably adequate for most in-house usage, but for a presentation you'd want to print the graphs without titles and then hand-letter them

The pesky bugs that infect the Zebra environment seem to reflect a sloppy attitude on the part of the program developers. On one menu, the free-form text option appears when, in fact, this option is part of the Giraph program and is intended for use with plotters only. On a hatching density menu, two of the selections also apply to plotters and not printers. These appendages should have been removed when the program was adapted from Giraph.

But the program is at its messest in the documentation. The manual doesn't mention Zebro's horizontal and high-low graph capabilities. It documents the creation of bold and slamed text, when, in fact, these features don't exist in this program. One amusing goof is when the manual instructs you took at some sample illustrations and nothing follows but an empty white page. There is no indx or glossay. In sum, the Zebror manual is sortly in need of revision.

Gwei is low price, Zeros is something to distribute of an industry phenomenon. The features included in this package outshine many of us is expensive counterparts. With Zeros's that instead of vice veras. Coupled with the program's versatility is a refreshing similar of conduction of the conductive counterparts. With Zeros's program's versatility is a refreshing similar particular of the conductive counterparts. Or conductive counterparts with Zeros's manual could stand some polishing, and for Set's you can't do much better.

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| Maynard Electronics | 35 | _ |
| Floppy Drive Controller | 119 | D |
| Internal Hard Disk (10 Meg) with | 119 | All drives are comp |
| WS-1 Controller | 859 | supplied with a prir |
| Internal Hard Disk (10 Meg) with | 003 | Comes with comple |
| | 1049 | instructions. Drives |
| Mouse Systems | 1045. | Tandon |
| →PC Mouse (w/software, pad, & PC Paint | 139 | TM 100-2 (51/4") full |
| NEC | , | |
| Pinwriter P2-3 (IBM, 80 column) | 559 | |
| Pinwiter P3-3 (IBM, 132 column) | 759 | |
| -Spinwriter 2050 (3550's little brother) | 679 | |
| | 1099 | |
| Spirrwriter 8550 (IBM-PC compatible) | 1489 | |
| Orchid Technologies | | |
| All Orchid Boards come with PCnet Dri | ve | |
| (Ram disk), PCnet spool (print spooling |). | |
| disk caching & partitioning | | |
| Blossom 64k upgradeable to 384k, | | |
| with clock calendar, serial and | | Has IBM's re |
| parallel port | 229 | about the PCir |
| PCnet Daughter Board (piggybacks to | | you're upstream |
| Blossom) with version 3.0 networking | | |
| software | call | Never fear. J |
| PCnet Blossom 64k Blossom Board with | | eliminated the |
| the Daugnter Board installed | call | mean IR CO |
| PC Turbo 128k | call | to roll over at |
| PC Net (stand alone card). | cail | committed to |
| Paradise Systems | | committed to |
| -Modular Graphics Card . | 275 | |
| -Multidisplay Card | 289 | |
| Princeton Graphics | | |
| HX-12 RGB monitor (690 x 240) | call | 1 |
| MAX-12 Amber monochrome montor | call | 1 |
| -SR-12 690 x 480 res w/Doubler . | . call | 1 |

Scan Doubler Board for SR-12

| Quadram | |
|--|-------|
| Quadboard 64k expandable | |
| to 384k, with clock calendar, paralle | 4, |
| senal & game port, I/O bracket, and | 1 |
| Quadmaster software | \$249 |
| -Microfazer Printer Buffer (parallel) w. | CODY |
| MP 64 (64k) upgradeable to 512k | 163 |
| -Quadcolor I. | 197 |
| Quadchrome RGB Monitor | 469 |
| Quadchrome II | 449 |
| SMA (Systema Management) | |
| PC-Documate Karboard Templatee | |

available for: DOS/Basic 1 1 Supercalc 3 DOS/Basic 2 0-2 1 Wordstar Lotus 1-2-3 Turbo Pascal Symphony WordPerfect Multiplan (IBM) dBase II Multiplan (Microsoft) dRase III Peachtext 5000 Framework Easywriter II Multimate

DRIVES

All drives are completely pre-tested and are supplied with a printout of the test results. Comes with complete step by step installation instructions. Drives are 320k/360k

TM 100-2 (51/4") full-height drive (DS.DD) 109

TEAC FD-55B (51/4") half-height drive (DS,DD)

Free mounting bracket with each pair of half-heights.

MEMORY

64k Memory Lipgrade Set for IBM-PC
Or XT system board. 19.
44k Memory Lipgrade Set for any memory
board specify make of board. 19.
Install memory upgrades & run diagnostics
at time of board purchase only
DISKS

INFORMATION SERVICES Compuserve

Still Kicking.

each 12

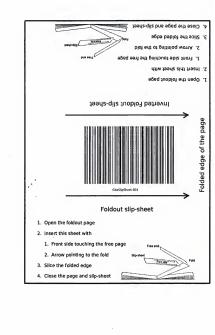
Has IBM's recent announcement about the PCjr. left you feeling like you're upstream without a joystick! Never fear. Just because they've eliminated the little mitro doesn't mean JR CONNECTION's going orl lover and play dead. We're committed to our junior customer. We'll continue to offer low prices on lots of products, with great support.

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CIRCLE 339 ON READER SERVICE CARD





J. Follow instructions on the other side

Inverted Back



Back

1. Follow instructions on the other side

some advice, assis

Snooper Troops I (ages 10 to adult)... \$30 Snooper Troops II (ages 10 to adult) 30 Most Amazing Thing (ages 10 & up) President's Choice (ages 13 to adult) Face Maker (ages 3 to 8) Kids on Keys (ages 3 to 9) Story Machine (ages 5 to 9) 23 Fraction Fever (ages 7 to adult) -Kinder Comp (eges 3 to 8) 20 Rhymes and Riddles (ages 5 to 9) . 20 Hey Diddle Diddle (ages 3 to 10) . 20 Alphabet Zoo (ages 3 to 8). Stone (requires graphics board) My Letters, Numbers, Words (ages 1 to 5) 29. Kids Stuff (ages 3 to 8) 29 Across the U.S.A (ages 5 and up)

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Swivel base for your monitor 5 switched outlets - includes "Master" switch to control all outlets as well as

individual switches Surge suppressor - keeps power surpes and spikes et a sale level Static protection - touch the name plate before you begin work and static charges are grounded

HARDWARE

| AST Research (For IBM-PC or XT) | |
|---|------|
| All AST Boards come with SuperDrive. | |
| SuperSpool, and one yeer warranty | |
| SixPakPlus 64k upgradeable to 384k, w | th |
| clock calendar, serial and parallel ports | |
| (game port optional) | 249 |
| MegaPlus II 64k upgradeable to 256k (c | of . |
| more with MegaPak) with clock calenda | r |
| and senal port (parallel, game, or secon | ď |
| serial port optional) | 249 |
| MegaPak 128k (not upgredeable) | 209 |
| MegaPak 256k | 339 |
| I/O Plus II with clock calendar and seria | 1 |
| port (parallel, game, or second senal | |
| port optional) | 125 |

| for any AST board (specify board) | 35 |
|--|-----|
| Connectall connector bracket (PC only) | 19 |
| AST-5251-12 | 529 |
| AST-5251-11 | 709 |
| AST-3780 | 589 |
| Amdek | |
| Video 300G monitor (green) | 139 |
| Video 300A monitor (amber) | 149 |

179

call

| Video 310A monitor (amber). |
|--|
| Color 600 - RGB monitor. |
| Compucable |
| Plastic Keyboard & Drive Cover Set |
| HBM Mono Screen Enhancement |
| Printer to IBM Cable (specify printer) |

| Cuesta Systems Datasaver (200w power back | unl | |
|---|-----|--|
| Curtis | υμ) | |
| STANDS | | |

| PC Pedestal (for IBM Mono or Color) | 37 |
|--------------------------------------|----|
| →PGS or Quadchrome Adapter for above | 9 |
| Low Profile Tilt and Swivel Pedestal | 37 |
| AD-2 Adapter for Portables | 15 |
| System Stand | 19 |
| | |

CABLES Extension Cables for IBM Mono Display 35 Keyboard Extension Cable (3 to 9 feet) 27 AC Plug Adapter (any monitor to your PC) 8

SURGE SUPPRESSORS All surge suppressors have an onloff switch Diamond (6 outlets). 33 43 53

Emerald (6 outlets: 6 ft cord) -Sapphire (3 outlets: EMI/RF) filtered) . -Ruby (6 outlets; EMI/RFI filtered, 6 ft cord) 63 Epson All Epson printers have built in graphics capability. In addition, the "Plus printers can print in neer letter quality (NLQ) with the

addition of the NLQ parallel or sensi option. LX-80 (replaces RX-80 - includes NLQ) call ₽X-100 call FX-80 Plus call FX-100 Plus call √IX-80 call

| GAMES | |
|---|---|
| Blue Chip | |
| -Milloneire | 3 |
| -Tycoon | 3 |
| -Beron | 3 |
| Broderbund | - |
| Broderbund Lode Runner | 2 |
| FriendlySoft | - |
| FriendlyWare/PC Arcade | 3 |
| Hayden Software | - |
| Hayden Software | 3 |
| Inforom Difficulty laught chown in italics | |
| Infocom Difficulty levels shown in italics Seastalker (junior) . Enchanter (standard) . | 2 |
| -Enchanter (stancard) | 2 |
| the Witness (standard) | 2 |
| Planetfall (standard) | 2 |
| Cuthroat (standard) | 2 |
| Hitchhiker's Guide (standard) | 2 |
| →Zork I (standard) | 2 |
| -Hilchhiker's Guide (standard) -Zork I (standard) -Zork II (advanced) -Zork III (advanced) | 5 |
| Zork III (advanced) | 5 |
| Infidel (advanced) | 2 |
| Sorcerer (advenced) | 2 |
| Suspect (advanced) | 2 |
| -Dearline (evnert) | 3 |
| -Deadine (expert) -Starcross (expert) -Suspended (expert) | 3 |
| Cusponded (cusport) | 3 |
| Assistant (experi) | 3 |
| for most infocus comes. Specify come | |
| Invisiclues (finit bookiets) are available for most infocom games. Specify game Microsoft | |
| Flight Simulator | 3 |
| Origin Systems | 3 |
| Ulima III | 3 |
| PCSoftware | 3 |
| Armchair Quarterback | 2 |
| Chess 2001 | 2 |
| Chess 2001 Championship Blacksack | 2 |
| Professional Cathures | 2 |
| Professional Software Trivie Fever | 2 |
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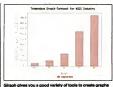
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can definitely look down on
many of its competitors. The
program creates a variety of
charts and graphs, including line,
but, three delimensional pel, scalbines them to create a spectrum
of interesting graphs and charts.

Its versatile output can be produed with all Epon-compatible
printers and a variety of piotens,
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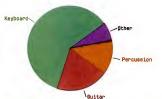


series of graphs can be displayed | with maximum visual impact.

Instrument Families Used with MIDI



Keyboard = 60% Guitar = 20% Percussion = 13% Other = 7%



Source:

American Music Association 1984 Market Survey Courtesy AMA

Prepared by ComputerBand Inc Marketing Department March, 1985

Giraph Business Graphics 4.5 CompuVision 70 Greenwich Avenue

New York, NY 10011 (212) 620-8134

CIRCLE 695 ON READER SERVICE CARD

LIST PRICE; \$95 REQUIRES: 192K RAM, one disk drive SUPPORTS: Video boards—any color graphics (not

Hercules)
Printers-Epson and compatibles
Plotters-IBM XY/749; Hewlett-Packard
7470A, 7475A, 7550A; Amdek II: IBM

XY/750
DOS versions=1.1, 2.0
Other operating systems—none
DOCUMENTATION:

Tutorial-ptu Manual-tes COPY PROTECTION: nep

GENERAL GRAPHICS FACILITIES: pcf, pcd, mda SCREEN GRAPHICS FACILITIES:

anb, ssh, msd SCREEN/PRINTER/PLOTTER

Screen Texts

FACILITIES:
Hatching—mht
Color choice—mee
Legends—mel, vip
Header lines—3
Comment lines—16
Note lines—16
Comment position—vep
Type fonts—1
Type fonts—1
Type fonts—1

Chart overlays-2 Axis scaling-mas Grid display-mgd Tick precision-mtp

Page adjustment-ppa, hva, psa INPUTS: Sources-ikb

Graphics formats-none Standard formats-ASCII, DIF, SYLK

CHART TYPES: Column charts—cls unspecified, 12 cgs, 60 cps, 12 ssc, noc, 3dc

Bar charts-brs unspecified, 12 bgs, 60 bpg, 12 ssb, nob, 3db Line charts-12 lns, 60 ppl, 3 tpl, 12 lsm, utl,

Line charts-12 Ins, 60 ppl, 3 tpl, 12 Ism, uti usm, sll, fil, spl Regression types-none Pie charts-12 psl, 12 eps, epv, uap

Pic charts—12 psl, 12 eps, epv, uap Text/word charts—3 fpc, cts, jtc, bts, utx Gantt charts—none Organization charts—none Bubble charts—none

High-low charts—4 ihl Surface-area charts—12 lns, 60 pls

as a "slide show" on the monitor or submitted as a batch job to the printer or plotter. Creating a Giraph graph is a fluid, quickly mastered operation. And at \$95, it's easy to overlook the package's occasional quirks.

soutia quirks.

Graph relies on a well-organized, menu-driven program. Function-key functions, listed on the bottom of each screen, supplement the mean choices. The must be proposed to the property of the week, months, and years, are already formatted). Once the initial designs is created, design menus let you add trites, specify colors, hatchings, shadings, and scalings.

The program can handle up to 12 variables, with 60 data points each. The pie charts can display up to 12 slices, all of which can be exploded. Pie charts can be represented in degrees, percents, or as ratios of a full circle. Bar charts can be clustered, spaced, stacked, or depicted in 3-D. An advanced program feature combines bar and line graphs on the same chart with separate right- and left-axis scaling. Giraph lets you size and position graphs anywhere on the paper or screen, and you can use any printable symbol to mark a data point. With its six different hatchings, five hatching densities, three line patterns, and several line thicknesses, Giraph gives you the tools to create graphs with maximum visual impact.

By selecting the Text Chart option from the main menu, you can produce customized text-only graphs. Creating a text chart is a fill-in-the-chart affair, you can specify text attributes such as size, color, and justification.

Giraph's Slide Show/Batch Job option produces graphs previously saved on disk. The slide show accommodates black-andwhite, high-resolution or three-color, medium-resolution presentation; you specify the order and the duration of each slide in the presentation. You can send batch jobs either to the printer or the plotter.

You enter data by using the arrow keys, typing in the data, and labeling the columns, as in a spreadsheet. The function keys are used to insert rows and columns and to enter values onto the data grid. If you want to recall a saved file, you can call

up a directory of all files with the Giraph extension .DES. After you select a stored file, the data is displayed on the data grid for your approval or modification. Data files can also be imported from DIF, SYLK. and ASCII formats.

When plotting a graph, Graph allows you to Insert test in various orientation, including vertical and opposing right and sugges, anywhere on the plot. This "free text" option is inspiring but tricky. Free text" option is inspiring but tricky. Free text is missed to plotter output and will not be displayed on the screen. To use the feature you've gets to constantly attend your plotter, manually repositioning the error trained to manually align lines of type, or your plotter is physically separated from your computer, you'll have problems

The only way to print a graph is to use the Shift-PtSc key combination and do a screen dump. To print a graph on the printer it must be printed on the display screen first. The Giraph output menu lists "Graph now on displayprinter" as a single option, but it would be nice to have the choice of outputting to the screen or the printer.

using this feature.

Another small flaw is in Giruph's printed text options. You can choose from among small, medium, and large text. These measurements do not let you determine if your text will ultimately fit on a plotted chart. Insulating the user from mathematical and typesetting jargon is good, but you should be able to tell if the text will fit the page prior to optiming.

The manual is the most obvious weaks spot. It is rife with typographical errors and misleading information. For instance, the word date appears instead of data, and the document references the C. Itoh printer while the screen references an Amdek. The manual doesn't mention horizontal and high-low graphs, even though Giraph produces them. There is no index. A revised manual would be welcome.

Despite these minor problems, Giraph produces interesting and varied business graphics at an affordable price. You are given a wide range of choices without the complexities of some of the other featureladen graphics packages. For the money, Giraph is one of the best buys in the business graphics zoo.





VCN ExecuVision

The Cadillac of Presentation Graphics

CN ExecuVision may be for you if you want a package that can do it all and don't mind paying the price. ExecuVision generates the normal business graphics, such as bar graphs and pie charts, but it is also a full-service package that offers the electronic equivalent of clip art as well as a variety of type fonts, free-form drawing, animation, and special effects. It even includes a slide-show feature. In addition, when combined with its companion product, EV Capture, ExecuVision can take any screen display from any other program and spruce it up for color output. The complete package offers a whale of benefits with a price tag to match.

ExecuVision turns you into an instant hi-tech Picasso with its hundreds of full-screen, full-color images that you can "cut and

paste." You can use the images to add interest value to your charts and graphs or simply to illustrate important topics. (One caveat: Executivition's libraries of images are sold separately.) A vailable libraries include borders, initials and decontive design, an industry and business catalog, the world's faces and figures, maps and international symbols, health and fitness, firm nancial services, transportation, and the computer collection. Prentice-Hall says more libraries are under development.

You can use the electronic clip art to spruce up a basic bur chart by adding a realistic drawing that depicts the topic of the data. You simply position a box around the figure or pix (a part of a picture) that you want to "ext out" from one of the library images and then position the figure one your own electronic side for "pasting." Every alide or image that you create, can be added to the property of the presentation graphics packages of feel libraries to convey your own message. Other presentation graphics packages of feel libraries of prestored images, but none comes close of the presentation graphics packages comes close of the presentation graphics packages of the libraries.

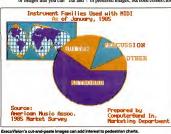
to matching ExecuVision's colorful, straight-from-the-art-department look.

Type fonts are another strong suit of Execultision. With the different ones, you can quickly create showy text slides. Each font comes in a different size that you can enlarge (but not reduce). You can also overlay text on a colored background with or without a cut-out effect. For more distinctive type, Execultion's graphics library includes decorative initials that you can cut and paste onto you slide.

With ExecuVision, you don't have to search through a manual every time you forget a command. This menu-driven package flashes a short, helpful prompt to explain each command as you highlight it with the cursor. Menus are layered so that each choice takes you to a more detailed menu. But after using each option once, you can generally keep the options straight because the prompts remind you what each option means.

Even Cadillac's aren't perfect, however, and this top-of-be-line package has a few dents that limit its usefulners. All though the mean structure is a boon to occupie the perfect of the

Another irksome feature is that you cannot access an on-line directory of slide names at the point in the program when you are asked to type the slide's name. But when you use stock images from the libraries, the lack of an on-line listing is no problem because their names are listed in the accompanying library booklets. Keeping track of the names of your own images can be barrier han it occurs.



.

VCN ExecuVision Visual Com

ations Network, Inc. 238 Main St. Cambridge, MA 02142 (617) 497-4000

CIRCLE 666 ON READER SERVICE CARD

LIST PRICE; \$395 (capture module, \$125) REQUIRES: 256K RAM, two disk drives

SUPPORTS: Video boards-IBM Color/Graphics Monitors-IBM Color

Printers-Epson Graftrax, JX-80; IBM Graphics. Color: Diablo Inkiet; Facit 4544; IDS Prism Quadram Quadjet; Canon Inkjet; Hermes 615 Pioners-Hewlett-Packard 7475A DOS versions-2.0, 2.1

Other operating systems-none DOCUMENTATION:

Tutorial-ptu Manual-gtm, idx, tes

COPY PROTECTION: hdk GENERAL GRAPHICS FACILITIES; pcf.

SCREEN GRAPHICS FACILITIES: 18th,

asd, msd SCREEN/PRINTER/PLOTTER

FACILITIES: Hatching-nht Color choice-acc, mod Legends-mcl, vip Header lines-unlimited ment lines unli Note lines-untimited Comment position-fcp Type fonts-10 Type font sizes-unlimited

Chart overlays-unlimited Axis scaling-aas Grid display-agd, mgd Tick precision-atp, mtp Page adjustment-hva. psa INPUTS:

Sources-ikb Graphics formats-Visitrend/Plot Standard formats-non

PROGRAM CHARACTERISTICS: Design method-fsd. std User interface-101 mop, tm Type fonts and sizes-10 fnt, 10 fny Pattern handling-30 ppa Drawing tools-bbm, vpb, cop, idr edefined charts and images-pel, ppi, pli Other business chart formats-n Image libraries-30 pis, 19 ila, \$80-\$90 ail, si

spite its flaws. In fact, you will find that adding color and special effects to your presentations is fun. If the colors of the library images don't appeal to you, you keep pressing one key to cycle through foreground and background color schemes, based on a color-coordinated palette, until you find what you want.

Another slick ExecuVision trick is motion. You can build slides with elements that move in straight lines. Or you can add interest to your presentation with a skier sliding down a hill, a bar growing up the scale in a chart, or an airplane flying through the air. For a unifying effect, you can move one element through several different slides and even leave a trail behind.

After creating a graphic and saving it to disk, you can call it back up along with other stored slides to create an entire presentation. ExecuVision's slide-show option allows you to show your graphics in sequence on the computer screen. You sort the graphics into the desired order using the prepare option and then use the run option to display each image on the screen in turn, with either automatic or manual advance. One double-sided, double-density disk can hold 30 to 40 slides.

ExecuVision's manual is not only clear but colorful. The 446-page manual introduces the commands in both a slow, easy style and a fast-track method, but it lacks a bird's-eve view of the package and a card that summarizes the commands. The manual's index would be more helpful if it highlighted the page that best describes a particular topic rather than listing every page number that mentions the topic. The index is combined with the glossary.

ExecuVision's copy-protection and backup policies could use revamping. Currently, you must always have the original system disk to create and run your slide shows. Backup copies cost extra. It would be helpful if you could at least run a slide show without the system disk.

One final peculiarity is that ExecuVision will not run on computers equipped with certain AST boards. If you plan on running it with AST equipment, you had better contact Prentice-Hall to see if your equipment is compatible.

The only real drawback of ExecuVision is the high cost of its "extended" package-that is, the libraries. Without them, the package loses a great deal of its appeal. ExecuVision images certainly have an artdepartment look that you will not find in other graphics packages that offer electronic clip art. But that look commands a steep price. If you need a graphics package with slick visual building blocks you won't go wrong with ExecuVision because it can help you create presentations that go bewond the standard fare.





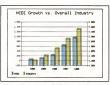
Graff Hopper

Scaled-Down Main Frame Graphics

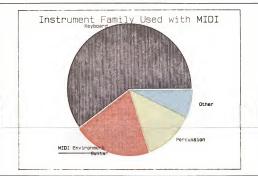
rafflopper's innovative approach makes chart-building simple. The package provides a library of 101 ready-made chart formats including pies, bars, lines, and combination charts. By selecting the chart number you desire and entering your data in response to the prompts, you can quickly create no-frills charts in a final form and print them in

color or black and white.

GraffHopper is a scaled-down version of a more potent package called GDSS, which runs on Burroughs and NCR machine the casiest way to or



The easiest way to create a GraffHopper chart is to select a chart from its library.



TAPE IT EASY.

Boy, are you in for a surprise. You know you need mass storage. And you know you need some kind of backup.

But what you don't know is that making a backup from your hard disk can take the patience of a saint. And tax the memory of an elephant.

Unless, of course, you have a little TLC. The new TrimLine Combo from Corvus. You get mass storage (20 Mbytes). The incredible speed and efficiency of a hard disk. And an integral tape backup.

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First of all, your TLC fits in beautifully. Between your IBM PCs monitor and base. No bulky boxes. And no clumsy cables and wires to trip over.

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Finally, you'll enjoy the backup speed of the TLC. There's no formatting of blank tapes (which can save you about two hours). And no worry about losing data to bad sectors the format has called good.

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CORVUS

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chip ser. Add 256 KB to PC-AT
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built in the first place.

THE BALANCING
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lots of numbers and lots of numbers and words, in the shortest possible time. A labor saver. A time saver. nce, a money save o, do your part for effec hard disk storage is no place to be penny-wise and

and foolish pound foolish.
TELL TIM YOU NEED
HIGH SPEED
AND DATA PROTECTION.
These and other
important features do add

important reasures on onest, but that makes a premium drive.

Anything that can be made, can be made cheaper, sell for less, offer lower performance, and probably die young.

Remember, usually

Remember, usually you get what you pay for, and you ALWAYS get hat you don't. ALL HARD DISKS ARE NOT CREATED EQUAL.

There are vast differences in the speed and reliability of Winchester hard disks. Since the IBM PC-AT is an incredibly fast machine, a increably fast machine, a alow drive can make an AT ran like an XT. So, before you get stuck with a slow drive in your AT, save your boss two grand and buy an XT. Or better yet, buy the AT and avoid any drive with Access Times over 40 milli-

Now tell 'em the drive at have a data protec-a scheme. One that's y to use and reliable. Winchester heads read and write while "flying" a few microns above the data surface. If the heads contact the recording media, you risk a head crash, and significant or total data loss

So, even a fast drive without data protection is virtually worthless. Frank-ly, we'd rather sleep at

BEWARE OF ISER DEPENDENT PROTECTION SCHEMES. Some drives have a safe landing zone for the heads, but you need to call

heads, but you need to call a separate program to send 'em there. If you don't call that program, and most folks won't, the heads in these drives ALWAYS land on data when powered down. The alightest bump or vibration can move the heads, wiping out those data tracks. And the R/W heads can become contaminated thus increasing the error rate, slowing down average ac-

Consequently, those drives offer a very high risk of head crashes, a false sense of security, and

What's your data worth? \$200? \$400? Specify AUTOMATIC data protection. ATplus has it. And it doesn't cost, it pays. PEACE OF MIND.

Specify AUTOMATIC park and lock of the heads on power down.
This system provide unparalleled head crash protection, by sensing power loss to the drive and retracting the heads to a dedicated landing

zone before they can I Since this is 100% automatic, user-dependent risk is eliminated.

OUR DRIVES HAVE ALL
BEEN TO BOOT CAMP.
Avoid drives that
CLAIM PC-AT compatibility but can't BOOT the AT y the time you juggle the

one of those drives, the phrase "user hostile" will ave deep personal signifiwe believe that computers ought to serve people, not the other way

BEWARE OF THE BARGAIN BAND-SCHLEPPER. Avoid drives with in-expensive Band Stepper

itioner technology positioner technology. These were pretty good way back in 1980, condering that's all anyone ad. But by today's stand ards, they're inaccurate and very mechanical. They waste time look ing for the right track to read or write. And they're worth no where near the price you'll pay for 'em -in more ways than one.

THE HIGH TECH SOLUTION Specify state of the art ROTARY VOICE COIL (RVC) head positioner an CLOSED LOOP SERVO

technologies.
This system uses a
DEDICATED SERVO
SURFACE (DSS) for continuous head location

information.
The RVC and DSS
use a large scale microp
cessor to translate new track seek commands int current that is applied di rectly to the RVC.

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This moves and holds the R/W heads at the exact track intended. Speed is dramatically increased since head movement is created electronically, with minimal mechanical interfacing

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BUSINESS GRAPHICS

chines. GraffHopper occupies I megabyte of disk space spread across three floppies that handle booting, the program itself, the library of 101 charts, and the help files. The system is copy-protected and there are no provisions, in this version, for a separate data disk. You must save your charts on the program disk.

Menu Mode

To create a chart in the menu mode, you select a chart from the library, or Chartbook, of 101 ready-made images. A series of prompts then asks you for such pertinent details as the number of bars, the value assigned to each bar, the title of the chartwhatever is appropriate to the type of chart you have selected. These prompts are easy enough to answer, though the curious beginner may be distracted by the unexplained numbers or codes that flash on the screen at various points in the process.

Command Mode

Alternatively, a command mode that includes formatting commands is available if you would rather build your chart from scratch. All the commands are listed alphabetically in a handy pocket guide. You can also chart data from the DIF files created by many spreadsheet programs, or from tabular ASCII files created with your word processing program, a BASIC program, or any other source. You can build command files that let you re-use your own customized formats or load commonly referenced DIF or ASCII data files.

Considerable Problems

Two fonts are available: an italic serif style or sans serif block characters. Most charts in the library use the rather plain block letters. You can enter a main title and a secondary title for a chart, but in the tested charts the secondary title was overwritten by other parts of the chart. You can give the chart a name as opposed to a general title, but in our pie chart a legend on

one of the slices overwrote the chart name. The Hewlett-Packard 7475A plotter stubbornly resisted the tester's best efforts to print the first chart, even though the configuration parameters were used. It seems that GraffHopper has its own implanted spend instruction. A call to Data Business. Vision settled the matter with a patch made in GraffHopper's command mode.

The manual is printed in computer-output characters that have been reduced in size and uses underscores or uppercase letters for emphasis, but it has one nice design feature: It presents the whole sequence of unannotated, ready-made charts that the library comprises in numerical order. However, there's no index or troubleshooting section, as we quickly discovered when we got lost in command mode by accident. Since we could find no EXIT. OUIT, or END command in the Pocket Guide to commands, we used the expedient method of returning to menu mode: reboot the system and start GraffHonner from scratch.

The first third of the manual describes how to use the command and menu modes, enter data, add a title, and so on. These instructions are direct and concise, telling you what to do when and why. However, this section is not designed to nurse along an absolute beginner, for whom an interactive tutorial demonstrating the program's responses to each command might be more effective.

The manual also includes about a dozen pages summarizing how to make the sample charts. It lists the appropriate menu selections, their corresponding command words, and data and title entries and cites further information in the reference section by page number. Though this "how to" format is convenient, it can be frustrating, since all the menu path descriptions begin with the number zero, which is not a valid menu choice. Furthermore, despite the frequent references to further information by page number, there are no page numbers either in the reference section or in any other section of the manual, except for the opening page of each section. Perhaps page numbers will be added in the promised next release of the package, along with an index. In any case, this version is not what you should expect for \$300. In all fairness, Data Business Vision

says that a new version of GraffHopper scheduled for release soon will solve many of the problems we encountered. The company's support staff was very straightforward and helpful with the rough spots and has a toll-free support line. However, until the newer release cernes out the caution flag is up for this one.

GraffHopper 2.0
Data Business Vision, Inc. 3510 Dunhill Street Suite B San Diego, CA 92121

(619) 450-1557

CIRCLE 670 ON READER SERVICE CAPID

LIST PRICE: \$295 REQUIRES: 256K RAM, one disk drive

SUPPORTS: Video boards-IBM Color/Graphics, or

compatible

Printers-Epson and compatibles; IBM and compatibles

Plotters-Hewlett-Packard series; Houston DOS versions-2.0, 2.1

Other operating systems-none DOCUMENTATION:

Tutorial no Manual-gtm, tes

COPY PROTECTION: hdk GENERAL GRAPHICS FACILITIES: pcf.

ped, mda

SCREEN GRAPHICS FACILITIES: none SCREEN/PRINTER/FLOTTER

FACILITIES: Hatching-aht Color choice-acc, mcc Legends-acl, mcl, flp Header lines-2 Comment lines-non

Note lines-none Comment position-none Type fonts-2 Type font sizes-2 Chart overlays-5

Axis scaling-uas, mas Grid display-agd, mgd Tick precision-atp, mtp Page adjustment-none

INPUTS:

Sources-ikb Graphics formats-n Standard formats-ASCII

CHART TYPES: Column charts-16 cls, 5 cgs, 16 cpg, 5 cpg, aoc. moc. 3dc. nvc

Bar charts-none Line charts-5 lns. t tol. 5 lsm. sol Regression types-none Pie charts-psl nor specified, epv Text/word charts-2 fpc, 1 bts, ctx, itx Gentt charts-16 rog, utg

Organization charts-none Subble clumbancon. High-low charts-16 ihl, 1 shl

Draw-It

Remarkable for the Price

sing Paperback Software's Draw-It to create business graphics is like trying to open a #10 tin can with a Swiss Army knife. The knife will certainly do the job, but it will never win a prize for efficiency. Likewise, Draw-It is a primitive program that forces you to use your ingenuity to get the most out of its rudimentary abilities. Draw-It's graphs and charts do not feature the cleanest lines, but this program gets the job done and at a fraction of the price of other business graphics packages.

ComputerBand Incorporated Organizational Chart CHAIRMAN Eugene Horris

> PRESIDENT Seymour Smith

VICE PRESIDENTS

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Jock Billinghom John Williams

SALES & MIKG OPERATIONS

Draw-It's graphs don't feature the cleanest lines, but the program gets the job done.

Instruments Used With Midi As of January, 1985

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BUSINESS GRAPHICS

Draw-It displays remarkable sophistication for its low price. The drawing part of the program uses a series of menu in-

You make all drawing movements with the cursor control and function keys: mouse control is also available as an add-on With the drawing component of the program, you can create such primitives as circles, boxes, and ovals, type text, and create free-form polygons; you also have access to more-complex drawing options, including copying, scaling, rotation, and reflection. As in MacPaint, you can zoom in to work on a detailed area of your drawing, and you can use the program's "step-

size" feature to draw dotted lines. Draw-It

also offers souned-up facilities for import-

ing data and screen images from other pro-

structions to manipulate a Logo-like pen.

grams. You enter the graph component through a submenu. The program asks you to choose either a pie, a bar, or a line format and define the x and y axes. Humorously, even Draw-It's nie charts have defined x and y axes; hence, you create a pie by making the v axis equal to 0. You can enter up to 100 data pairs, and the entry process is surprisingly flexible. You can insert and edit data pairs, define minimum and maximum axis values, and display the graph in one of two sizes.

While you're defining graphs, the program prompts you to enter the title and axis labels. However, these labels do not appear on your graph. You must re-enter the Draw program once the graph is created and manually enhance your work using the Text option. You can place labels anywhere on the screen, using the program's seven text sizes and two text orientations. Nonstandard text sizes reproduce very poorly on the display screen.

A Jurying Operation

Sometimes you have to be creative to get the iob done with Draw-It. The methods are crude, but I found ways to get around almost all of Draw-It's limitations. For example, you can fill in thin-looking text by entering the zoom mode to patch things up. In the graphing mode, the graphs display only the minimum and maximum axis labels: however, if you enter the drawing mode, you can manually insert the other tick labels. In addition, if

you have sufficient patience, you can even draw elaborate legends and labels and in-

clude pictorial icons in the drawing mode. The program executes graphs slowly, and the results often contain broken lines, especially in the pie charts. If you don't "eyeball" the broken lines, you'll find your "fills" running all over the graphs. To create a double-axis chart, you create two individual charts and try to superimpose them. You have to erase each axis and recreate it to make it fit. The Sistine Chapel could have been painted in the time it takes to enter the axis by hand. In other words, while little "doctorings" improve things, the process takes a long time. In the final analysis, you can't do very much about the overall look of these graphs. The jaggies are omnipresent, and the visual impact is "computer checkbook" modem.

> Humorously, even Draw-It's pie charts have x and v axes; hence, vou create a pie chart by making the y axis equal to 0.

Colorful Displays

The program displays three palettes of four colors, but you print the graphs by using the screen-dump facilities in black and white only. While Draw-It limits you to three graph selections, you can create other business graphics, such as organizational charts, Gantt charts, and flow charts, in the drawing mode.

One of Draw-It's strongest features is its data-capture capability. You can import data in ASCII or Numberworks (Paperback Software's spreadsheet) format into Draw-It. In addition, Draw-It's SAVE-SCREEN utility program captures screen images from other programs.

Draw-It's abilities are simple, but if you use its basic building blocks, you can achieve results. Certainly, its not a realistic program for you if you have heavy demands, but it is an entry-level "toy" that can introduce you to business graphics. Draw-It 1.0 Paperback Software International 2612 Eighth St Berkeley, CA 94710 (415) 644-8248

CIRCLE 676 ON READER SERVICE CARD

LIST PRICE: \$29.95 (add \$10 for nonconv. protected disk or \$5 for backup disk)

REQUIRES: 192K RAM, one disk drive

SUPPORTS: Video boards-IBM Color/Graphics, Paradise Modular, Paradise Multidisplay, Plantronics

Printers-any Eoson Graftmax or IBM Graphics

compatible Plotters-none DOS versions-2.0, 2.1, 3.0

Other operating systems-none DOCUMENTATION:

Manual-ids, tes

COPY PROTECTION: hdk

GENERAL GRAPHICS FACILITIES: pcf, ned

SCREEN GRAPHICS FACILITIES: none SCREEN/PRINTER/PLOTTER FACILITIES:

Hatching-mht Color choice-mcc Legends-ncl

Header lines-8 Comment lines-8 Note lines-8 Comment position-none Type fonts-2

Type font sizes-8 Chart overlays-none Axis scaling-uas

Grid display-ngd Tick precision-ntp

Page adjustment-no

Sources-ikb, iff Graphics formats-BSaved screens Standard formats-ASCII, Paperback Software

Products CHART TYPES:

Column charts-100 cls, noc Bar charts-none Line charts-1 lns, 100 ppl, 1 tpl Pie charts-100 psl, apv Text/word charts-none Gantt charts-non Organization charts-none Bubble charts-none High-low charts-none Surface-area charts-1 lns



BUSINESS GRAPHICS

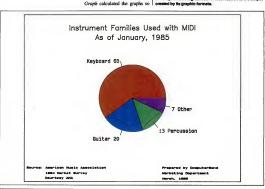
DR Graph

Feature Attractions: Math Coprocessor and GSX

esigned to produce common business graphs, DR Graph has one uncommon feature: it uses an 8087 math coprocessor chip. DR Graph comes in both a standard version and a version using the 8087 or its AT equivalent, the 80287. Though the standard version is fast in its own right, the 8087/80287 version takes off like a rocket. The sample chart provided with the package plotted to the screen in 6.2 seconds without the math chip, but in only 2.4 seconds with it. In fact, DR



DR Graph allows a great deal of m



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Opeo Item or Balance Forward

◆7 Customized Columns For Aging Report
 ◆Unlimited # Of Customers

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Supports Partial Payments Directories
 Year Customer History for # Of Iovoices,

Sales, Costs, And Profits

*Customized Text On States

Salesman, Or Customer Type

Accounts Payable

*Check Prioting *Automatic Allocation Of Available Cash To Payables

•Vendor Directories With Sorting By Vendor Code, Name, Or Territory *Aging Reports With 7 Customized Columns •Unlimited # Of Vendors *Mailing Labels *3 Year Vendor History For

CRT Inquiry And Printing *Automatic Forecasting of Purchas *Unlimited Allocations Per Invoice •Up To 10 Invoices Paid Per Check

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*Supports Average, Last Purchase, And Standard Costing Methods *Physical Inventory *Accepts Any Measure Units Per Case Like Automatic Changing Of Costing Methods
 Time And Product Inventory

*3 Year Product History Io Units, Dollars, Cost, And Profits *Automatic Forecast Of Product Sales

*Automatic Pricing Assignments *Alert And Activity Reports With 11 Sorts *CRT Shows On-Hand/On-Order/ Committed/Sales/Cost/Profit/Turns/GROI

*Allows Up To 99 Lines Per Purchase Order

 Per Line Discount In *
 Purchase Order Accepts Ge Discounts/Freight/Taxes/Insurance

Purchase Order Accepts Back Orders & Returns

 Purchase Journal
 Automatic Interfacing With General Ledger, Payables, And Inventory

*Invoicing On Plain Or Pre-Printed Forms

Automatic Updating Of Committed Products Io

*Interfaces With Inventory, Accounts Receivable And General Ledger

Forecasting *Unique program that automatically forecasts using your 3 year histor •Forecast Revenue And Expense Accounts *Forecast Vendor Purch

 Forecast Customer Sales, Cost, And Profit By Customer Or Salesperson *Forecast Inventory Item Usage By 4 Automatic *Forecast By Same As Last Year, Or % Base

From Last Year, Or Trend Or Least Square Trend Line Analysis Method

Minimum Hardware Requirements: 128K memory, one 5 1/4 DSDD floppy disk, 132 column printer, 80X24 CRT, MS-DOS, PC DOS

Runs on your: IBM (PC)r/PC/XT/AT), AT&T, EPSON, TANDY (1000/1200/2000), TI, COMPAQ, CORONA, SANYO, COLUMBIA, *(Computer names are tradenames and/or trademarks of

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BUSINESS GRAPHICS

fast that it finished them before my video card could switch into graphics mode: The charts ''nonned'' onto the screen!

charts "popped" onto the sereen!
Another unusual aspect of DR Graph's
that it runs under Digital Research's
Graphics System Extension (GSN). DRI
originally developed GSN as a common
finamework for interfacing graphics applications packages to the CPM operating
system and to pricipients such as plotters,
specially common, and properly as the complexity of the complexit

parameter to me user:

DR Graph is a menu-driven program that uses predefined graphics formats. Like the Peachtree Business Graphics System that it resembles in many respects, DR Graph allows quite a bit of modification to the program of the prog

the output created by the formats.

The program can produce line, bar, clustered bar, stacked bar, and pie charts. It can also create a step chart, which looks like an outline of a bar chart, and a stick chart, which resembles a bar chart but has lines instead of bars. Scatter and word-only charts are also in its repertoire.

DR Graph readily imports data in DIF and SDF file formats, then uses screen forms to specify the data and to describe the chart to be plotted. DR Graph allows only two-line chart titles and short axis labels, but it gives you full control over font selection, character size, and color.

With DR Graph you can position legends anywhere on a chart. However, unlike some graphics programs, this is not an interactive process in which you place the cursor on the text and then pull the text across the screen with the cursor. Instead, you go through a two-part, menu-driven process using the cursor keys or one of three popular mouse devices. Displaying the graph from the "Additional Curve Edit Menu" and using a special graphics cursor, you position the cursor where you would like to locate the legend, press a key to transmit these coordinates, then display the graph again to make sure you've positioned the legend to your satisfaction.

DR Graph also includes a really fine mechanism for combining up to four charts on one output screen or plot; you can save this multiple-chart layout as a separate entity and reuse it. The program also checks to make sure that all the charts in the layout exist.

Using the screen forms was straightforward, and it was necessary to refer to the manual for explanations of some of the less common terms only once or twice.

Installing DR Graph is easy and fast, although there are few "gochasi" in the documentation. The manual is a brand new version prepared specifically for the PC-DOS operating system. Unfortunately, it is both less attractive and less complete than the old CPM manual, and there is no on-screen help system—an omission that DRI should remedy.

What's worse, significant information is simply missing. For example, there is no indication of how to set any of the support ed plotters. The manual says, "Certain devices, such as the Hewhett-Packard 7490. Or 7479.A Craphis Pioter, require sadjustments. Refer to your hardware device documentation for assistance." The Her Brand is going not 71 what what has the support of the s

Once you determine the correct communications parameters for the plotter, installing it is simple. An excellent mendriven utility makes it easy to choose the screen option, plotter, and printer you are going to use. DR Graph's supports an interesting assortment of video-choices, including the Hercules monochrome graphics board and the superh Artist color graphics

board. It supports an ample number of printers and plotters but not as many as some other graphics programs.

DR Graph drove a Hewlett-Packard 7475 plotter noticeably faster than many

7475 plotter noticeably faster than many other graphics programs did. The quality of the hard-copy output was good, with excellent coverage in fully shaded areas. The new Version 1.5 of DR Graph includes a new driver for the H-P plotters that provides close correspondence between screen and plotted images. Owners of the older DR Graph are urged to upgrade. DR Graph are urged to upgrade.

user interface and very high speed in the 8087 version. While the program clearly could use additional development, it has the potential to reach the very top ranks of business graphics packages.

DR Graph L5 Digital Research, Inc. 60 Garden Court Monterey, CA 93942 (408) 649-3896

CIRCLE 669 ON READER SERVICE CARD

LIST PRICE: \$295 REQUIRES: 256K, two disk drives

SUPPORTS: Video boards-IBM Color/Graphics or 3270, Plantronics Color Plus, Hercules Graphics,

Printers-IBM Graphics; Epson FX, MS; Diablo C150; Okidata M84, C. Itoh 8510A; Centronics 351, 352, 353; Anadex DP-9001A, 9501A, 9625A; Datasouth DS 180;

9001A, 9501A, 9625A; Datasouth DS 180; DEC LA100, LA50, IDS Prism; Mannesman Telley MT160; Printronix Plotters-Hewlett-Packard 7470A, 7475A; Strobe 100, 200, 260; Houston Instruments

DMP29, DMP40 DOS versions-2.0, 2.1, 3.0 Other operating systems-none

Other operating systems—non DOCUMENTATION: Tutorial—ptu

Manual-gtm, idx, tcs
COPY PROTECTION: ncp

GENERAL GRAPHICS FACILITIES: pcf, pcd

SCREEN GRAPHICS FACILITIES: none SCREEN/PRINTER/PLOTTER FACILITIES:

Hatching-ahr, mbt
Color choice-ace, mcc
Legends-acl, mcl, vlp
Header lines-2
Comment lines-unlimited
Note lines-unlimited
Comment position-vcp
Type fonts-4
Type font sizes-100
Chart overlays-none
Axis scaling-ass, mss
Grid display-mgd
Tick precision-sap, mtp

Page adjustment-inva INPUTS: Sources-ikb, ims

Graphics formats—none Standard formats—ASCII, SYLK, DIF, SDF

CHART TYPES: Column charts-375 cls, 5 cgs, 5 cpg, 5 ssc, noc, nvc, npc Bar charts-375 brs, 5 bgs, 5 bgs, 5 ssb, nob.

Bar charts-375 bes, 5 bgs, 5 bpg, 5 ssb, nob, nvb, npb Line charts-5 lns, 75 ppl, 5 tpl, 5 lsm, vtl,

usm, sll, fll, spl
Regression types-none
Pie charts-16 pat, 16 eps, ppv, spv, epv
Text/word charts-4 fpc
Gant charts-none
Organization charts-none
Bubble charts-none
High-low charts-none

High-low charts-none Surface-area charts-5 lns



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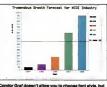
CIRCLE 535 ON READER SERVICE CARD

Condor Graf

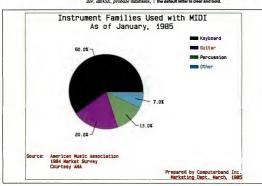
Covers a Lot of Ground in Two Steps

ondor Graf, from Condor Computer Corp., is a program that tries to be all things to most people. It produces a complete line of analytical business graphs, imports data in no fewer than ten different formats, and supports over 50 different printers and plotters. Its charts are excellent. To too it off, the program comes on only two disks, including all the device drivers, with room to spare.

Condor Graf accepts data in a variety of formats including Condor, dBASE, probase databases, the default letter is clear and bold.



Condor Graf doesn't allow you to choose font style, but



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CIRCLE 146 ON READER SERVICE CARD

DIF, CalcStar, Profit Plan, SuperCalc, SYLK, SDI, and comma-separated. It comes not only in a DOS version, but in CPM-86 and CP/M-80 versions as well. With its command language, you can program Condor Graf to print overlaid charts, create batch jobs, and otherwise manipulate your chart files.

Give Me Two Steps

You create a chart in two steps: compose and draw. During the composition step, you select the type of chart you want and enter the chart titles and axis labels. This selection is accomplished by going through three preliminary menus before you arrive at the chart composition screen. Once there, you can select any of 13 options for entering color and chart type and defining borders, titles, legends, floating labels, axis characteristics, ticks and grids, and specific graph characteristics. Each option you choose brings up an additional screen of options. Titles can be centered, flush left, or flush right in Condor Graf, otherwise the program positions everything on the chart for you. You cannot select font sizes or styles, but the default block lettering is nice and bold. Although some of the screens are jammed with information, cursor keys are not available to help you move around the screen to make your selections. To avoid this problem, you can leave all features at their default settings and display the chart right away.

Once you have saved the chart composition to disk, you can then draw the chart. This step involves returning to the main menu where you specify the data sources for the x and y coordinates as either the keyboard or as an existing file. You load the chart specifications, change the output device (if necessary), and indicate that you want to draw the chart. Finally, you enter your numeric data through the keyboard, unless you are importing data from an external file. You can also run a command language file to specify the size of the graph and its placement in the display area. If all goes well, the chart can be displayed, printed, or plotted

Although Condor Graf is menu driven, it still seems clunky to work with. For example, a prompt on the data entry screen says "Use END to stop input," but pressing the End key on the PC's keyboard

causes a zero to be entered on-screen. What the message meant was to type the mainframe-program command END. Also, the program does not include a directory feature, so you must either memorize the filenames for the charts and their input sources—as well as the data field names—

or write them down on paper.

Even when you accept all the program
defaults, you still have to answer a long series of questions. Something as easy as
creating a pie chart becomes a chore when
you are prompted to enter both x and y
data. Why doesn't the program know that
a pie chart is essentially one-dimensional.
Again, cursor keys are not available to
help you move around the screen so you
have to tab through every item to get to the
one you want to chance.

one you wan't to change.
The 350-page, typed manual has been
reduced from an 8½-by 11-inch original
reduced from an 8½-by 11-inch original
facing or underscoring to help you find
section headings. The manual includes error
message explanations but no index. It
would be helpful if the chapter or section
manes were included in the header of each
page. A 60-page tutorial takes you through
all the menus and some of the demonstration charts provided on the side demonstration charts provided on the case, but it's
asy to get foll once you're on you're only our own.

For example, the testers tried to create CVS and DIF files many times for the data, each time unsuccessfully. A Condor technical support person explained that he had no problems creating CVS and DIF files and suggested a look at the files on the demo disk. They were of no help. In any case, you shouldn't have to dump a file in order to find out how to enter data. The process should be explained in the manual.

process should be explained in the manual. Condor Origin makes a good attempt to to the graphics product for everyone, of the control of the control origin and accepting data from many different database and spreadsheet programs. Unfortunately, the creators put more effort into developing the guts of the package than in producing an easy front-end for the user. Look into Condor Craf if you are already using the Condor database system, or if you feel at home with the manifrant style of the control origin of the control origin you! If find that other packages in the same price range offer the same kind of graphing capabilities and are simpler touse. Condor Graf 2.0 Condor Computer Corp. 2051 South State Street Ann Arbor, MI 48104 (313) 769-3988

CIRCLE 676 ON READER SERVICE CARD

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Packard; Roland; Watanabe; Mannesmann Tally; Strobe; Sweet-P; Yokogawa DOS versions-2.0, 2.1

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Tutorial-stu, ptu Manual-gtm, tcs

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pcd, mda SCREEN GRAPHICS FACILITIES: anb

SCREENPRINTER/PLOTTER FACILITIES:

FACILITIES: Hatching-mht Color choice-mcc Legends-mcl, vin

Header lines-5
Comment lines-5
Note lines-5
Comment position-vep

Type fonts-variable
Type font sizes-variable
Chart overlays-10
Axis scaling-mas

Grid display-mgd Tick precision-mtp

Page adjustment-ppa, hva, psa INPUTS: Source-lib

Graphics formats—none
Standard formats—Condor, probase, MicroPlan,
Profit Plan, CalcStar, SuperCalc3, DBF,

DIF, SDI, CVS, SYLK, ASCII CHART TYPES: Column charts-20 cls. 4 ces. 22 ssb. noc.

Column charts-20 cls, 4 cgs, 22 ssb, noc, 3dc Bar charts-20 bes, 4 bgs, 22 ssb, nob, 3db Line charts-20 lns, 200 ppl, 10 tpl, 26 lsm, utl, usm, fil, spl

Regression types-none Pie chiets-20 psl, 20 eps, apv Text/word chiets-none Gantt chiets-none Organization chiets-none Bubble charts-none High-low chiets-200 fill

High-low charts-200 ihl Surface-area charts-20 lns, 50 pls



ARTPAK

Bells and Whistles for a Song



RTPAK has bells and whistles that can capture the attention of any audience, not just business people. While other graphics packages silently present their displays, ARTPAK adds a new note to presentation graphics with colorful, animated "slide shows" complete with musical accompaniment. It is a complete presentation package that features freehand drawing, animation, music, 32 type fonts, and functions for generating line. bar, and pie charts. ARTPAK also includes several Picturpaks that contain ready-to-use images of maps, people, buildings, and a variety of other subjects. All of this is offered at a price that is considerably below that of other packages with similar features.

The opening animation of the ARTPAK disk has the airbrushed look of the work of dedicated

graphics workstations. Other packages may give you standed, vertical-scaling animation, but ARTPAK goes one better-wetched scroling plus horizontal panning. Animation is one of ARTPAK's special vitrues. Unlike other animation packages witrues. Unlike other animation packages screen, ARTPAK allows you to alternate between two versions of an image during animation, resulting in PacMan-type graphics. This feature allows you, for cample, to animate a brid flying across the section with wings that flap.

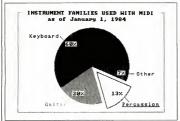
The Twist

With ARTPAK, you'll find the basic chart types, but there's a new twist to the creation process. Instead of using a menu or set of commands to construct the graph, you respond to a series of questions. For example, the program asks, "How many divisions will the pic chart have?" or "How many clements will be on the horizontal axis?" The program even prompts you for axis labels, titles, and grid lines. This chatty approach may work well for novices and occasional users, but it could become frustrating for those with more advanced skills.

The real power of ARTPAK lies in its chart enhancement features. Once the standard graph is created, you can begin experienced to be a standard graph is created, you can be retrieve one of the 150 predrawn Pictupak mages and modify in as you wish for a custom look without the same and effort of the properties. These modifications are supported to the properties of the p

The musical capabilities of ARTPAK sound good but pose problems if you have no ear for music. Writing an entire tune can be cumbersome since you must specify each note along with its duration, octave, tempo, and so on. For example, "Mary had a little lamb" is represented as: MBT100031.8gfe-figggPffff4pb-b-dffcgggFfffe-No doubt most of us would rather wait for the upcoming Musicpak libraries of prestored unes.

ARTPAK's slide show feature offers a plus for your presentations. Slides can be changed using cut shots or faded in with dissolves. This new approach to changing slides adds a flair not found in other packages. In addition, ARTPAK can store several hundred scenes on a single disk.



To the Drawing Board

The on-screen electronic drawing board is probably ARTPAK's best feature. With it, you can render circles, rectangles, lines, and freehand drawings using any graphics input device from a keyboard to a digitizing pad.

Images can be flipped, duplicated, turned, faded out, colored, and sized. You do all this manipulation with crosshair

Instead of using a menu or commands to construct a graph, you respond to question

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controls that give precision more commonly found in state-of-the-art graphics stations. If you accidentally delete or destroy an image that you really want, there is a restore function to get it back-a real lifesaver. But the most unique feature of the drawing board is the progressive fade-out function, accomplished using successive random erasures of dots in an image or word. You keep pressing the fade-out function key until you fade your image to

> ARTPAK adds a new note to presentation graphics with colorful, animated "slide shows" complete with musical

accompaniment. the desired intensity. A unique special effect can be achieved by combining the fade-out function with the animation-withtrailing feature.

The package is not without limitations, however. The use of crosshairs on a drawing board is a new skill for most users and could take some time to learn. For exam-

In contrast to the program, ARTPAK's manual lacks pizzazz. The enhancements to the program have evidently outpaced the manual updates since yellow addendum sheets are included to explain Version 1.04, and another 48-page booklet covers the latest changes to Version 2.0. Neither the manual nor the booklet has an index. which limits their usefulness as reference guides. However, there are some helpful tutorial exercises with prints of screen dis-

plays. It may not be perfect, but ARTPAK is certainly innovative. The program's extensive animation, music, and slide show capabilities make it quite a package.

ple, drawing a circle by defining its corresponding boundary box with the crosshairs is a less intuitive drawing method than defining the center and radius. There is an on-line menu of functions that helps, but it is no substitute for an on-line tutorial. You can access a help feature from the drawing board, but each option is explained on a second screen. It would have been helpful

Video boards-IBM Color/Graphics or Piotters-Hewlett-Packard 7470A, 7475A; IBM XY749: Sweet-P: Houston Instruments DOS versions-1.0, t.1, 2.0, 2.1 Other operating systems-none DOCUMENTATION:

to see a brief description of a function flashed directly on the drawing board While parts of the package are very easy to use, such as the automatic graphing capabilities, it takes time before you can use the drawing board well. In addition, ARTPAK has no plotting features and only outputs to IBM or Epsom printers.

SCREEN GRAPHICS FACILITIES: asb, ssh. msd SCREEN/PRINTER/PLOTTER EACH ITTES Hatching-mht Color choice-mcc Legends-acl, mcl, vip Header lines unlimited Comment lines-unlim

Comment position-ver Tyme fonts, 37 Type font sizes-t to 9 Chart overlays-unlimited Axis scaling-eas, mas Grid display-agd, mgd Tick precision-stp, mtp

Page adjustment-bya, psa INPUTS: Sources-ikb, ipt, iff

Graphics formats-PC Draw, PC Paintbrush, WW Executiv Standard formats-none

ARTPAK Presentation System 2.00 PalSoftware t560 N. LaBrea Ave. #103 Los Angeles, CA 90028 (213) 259-9659

n-Epson Graftrax; IBM Graphics, Color

DMP40, DMP29, PC595, PC695; Calcomp

GENERAL GRAPHICS FACILITIES; pcf.

CIRCLE 679 ON READER SERVICE CARD LIST PRICE: \$249 plus \$49-\$99 for plotter REOUTRES: 128-256K RAM, one disk drive.

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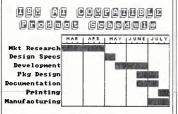
Tutorial-stu

ped, mda

COPY PROTECTION: nco

PROGRAM CHARACTERISTICS: Design method-fisd, std User interface-t0 mop, 29 top, tmu
Type fonts and sizes-37 fnt, t to 9 fns, 37 fny

Pattern handling-upa unlimited, vpf Drawing tools-blue, spc, and, coo, ide Predefined charts and images-pel, ppi, pli Other business chart for Image libraries-150 pis, 500 ila, 50.00 all, sup



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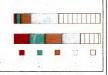
CIRCLE 210 ON READER SERVICE CARD

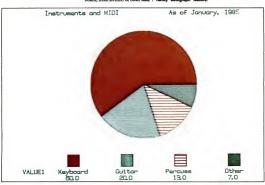
Grafox

A Mixed Bag of Strong Features and Problems

rifor is the Fox & Goller graphion package designed to use the
sarface. Grapics appears to be
sarface. Grapics appears to be
similar to Fox & Goller's
GGRAPH II, which imports data
from dBASE III flies. Unfortancity, while the two purport
to do the same things, they don't,
Grapics is noticeably less powerseen all the program bugs, a new
one popule to teast you.

Grafox can accept data that you enter interactively at the key-board, from BASIC or other data handy "au







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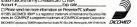
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604 Market Stre Elmwood, NJ 07407 BUSINESS GRAPHICS (201) 794-8883

files containing comma-delimited fields, or from DIF files like those created with VisiCalc. Grafox can also import columns of data from other Grafox charts. Within the program, a powerful query feature lets you manipulate data arithmetically and represent averages of columns, counts on records, percentages of a sum, or percentages of a count.

Grafox is menu-driven, and a directory within the program lets you manipulate files in the Grafox directory without exiting the program. It creates bar, column, line, and pie charts for display on the monitor and supports over a dozen plotters and

printers. Grafox features a number of shading techniques and a multichart capability that can place two color or three black-andwhite charts on the same page. An "autograph" feature lets you default or define your own shading and scaling parameters. The program also has an inverse video feature, a zoom feature, which crops unimportant areas from a graph, an "accumulate" feature, which adds up columns and plots the results, and an "average" feature, which draws an average line. You can also create and incorporate text files into the graph.

Subtle Problems

On paper, Grafox seems like an ideal program. However, its limitations are subtle ones. You cannot have more than four groups of data in color. Because of this constraint, any visual with five or more data elements can only be displayed in monochrome

You create multiple graphs ostensibly by assigning existing charts to share space on the page. During the multiple-graph process the program rescales the graphs but not the text. Grafox simply crops long titles, and it takes a good deal of trial and error to create new titles that fit. The program obstinately refused to plot the pie component of a pie/bar combination, but it did cooperate by printing them both on an Epson printer. In one instance, the program also mistakenly printed the same label on both axes.

Other disturbing problems cropped up during the testing of this program. On a number of occasions Grafox decided to save the graph to the screen instead of to

the disk. The screen then filled with interesting but useless program code. Incidentally, the name of the graph in question was one letter over the maximum allotment for graph names; rather than simply flagging the error, the program chose to misbehave.

Too Many Names

Grafox has more filenames than a cat has lives, leaving you prone to confusing errors. If, for example, you specify a color monitor, the program saves your files to one extension. Grafox has extensions for printers, black-and-white monitors, multicharts, single charts, Grafox data, and headers for BASIC data. Under normal circumstances you don't need to bother with these extensions, but on occasion it's

important to keep track of them. Grafox offers only one font and confines all graphs to the same size specifications. While the list of attributes that the program enables you to customize is admi-

> On paper, Grafox seems like an ideal program, but its limitations are subtle ones.

rable, two important features are immutable-font and graph size. Also, the manual and the design of the screen are cluttered and confusing. A scant two pages does a poor job as an index.

Grafox, with its attention to enhanced features, is a program that has a lot of good things going for it. The plotted output is crisp, clean, and attractive. Advanced features of the program let you use commands with arguments to speed up the graphing process, but the arguments that Grafox provides for aren't that powerful. The data query hanguage lets you summarize complex data. Fox & Geller's Grafox certainly has the ability to perform well, but for \$295, some of the rough spots should be

Grafox I.0 Fox & Geller

LIST PRICE: \$295 REQUIRES: 96K RAM, two disk drives

Video boards-IBM Color/Graphics Adapter and Printers-Okidata Microline; IDS Prism 80/132; Anadex 9000, 9001, 9500, 9501; NEC

Spinwriter; Epson Graftrax: C. Itoh 8510A-Datasouth 180; Diablo 1750; IBM Graphics Plotters-Hewlett-Packard 7470A

DOS versions-1.1, 2.0 Other operating systems-none

DOCUMENTATION: Tutorial-ptu Manual-gtm, idx, tcs

COPY PROTECTION: non

GENERAL GRAPHICS FACILITIES: pcf.

SCREEN GRAPHICS FACILITIES: anb

SCREEN/PRINTER/PLOTTER FACILITIES: Hatching-mht Color choice-mcc Legends-mcl, vip Header lines-varies

Comment lines-varies Note lines-varies Comment position-varie Type fonts-1 Type font sizes-1 Chart overlays-3 Axis scaling-mas

Grid display-med Tick precision-mtp Page adjustment-none

INPUTS: Sources-ikh Graphics formats-no Standard formats-ASCII, DIF, BASIC

CHART TYPES: Column charts-52 cls, 4 cgs, 52 cpg, 4 ssc, noc Bar charts-52 brs, 4 bgs, 52 bpg, 4 ssb, nob Line charts-4 lns, 52 ppl, 4 tpl, 4 lsm, utl, usm,

Regression types-none Pie charts-12 psl, apv Text/word charts-none Gantt charts-none Overvitation chara-score. Bubble charts-none High-low charts-none Surface-srea charts-4 Ins



ChartStar

A Bright New Star from MicroPro



Ithough known primarily as the producer of WordStar, MicroPro has long offered a wide range of complementary programs, including a simple file manager, report generator, spelling checker, and others. A recent addition, ChartStar, is a very good business graphics program that might well attract a stable audience.

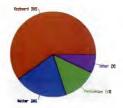
well attract a stratio auditractic.

ChartStar can produce a wider variety of charts than many, if not most, competitive products. It can plot horizontal and vertical bar charts, pie, and even line charts with dual y axes quickly



One of ChartStar's advantages is its

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and painlessly. It can also create the more complex charts such as Gantt, organization, and scatter, and combine some of them with the same ease. ChartStar also displays the various chart types to help you choose the format that best suits your

needs. The program uses menus for entering data and selecting options and presents onscreen input forms for specifying layout choices. These forms are clear and almost self-explanatory; a complete on-line help facility explains any unfamiliar options.

Considerable Flexibility

ChartStar has many niceties that contribute to professional-looking charts. One is considerable flexibility in design-especially given the strict nature of its input forms. Each line of a three-line title can have a different type size, and you can control the color of almost every element. ChartStar also lets you draw three-dimensional bars and pies. Once you have entered the data and completed the chart's input form, you can display the chart on a color monitor by hitting a function key.

The method of producing organization charts is especially noteworthy. Unlike the other ChartStar graphs, which use input forms, organization charts are simply painted" on the screen with cursor movement keys. The program can make only rectangular boxes (not the oddshaped symbols used in flowcharts), but the boxes can be either fixed in size or stretched to accommodate the text inside. You can also draw lines between boxes with the cursor keys. For some reason, the few competitive programs that can produce organization charts make the process very difficult, while ChartStar's couldn't be easier or faster.

ChartStar's plots are also first rate, and it can combine several charts on one piece of paper. Solid-area fill is fast and thorough. ChartStar makes special provisions for plotting on overhead transparencies, and has a competent slide show system.

One minor drawback is that Chart-Star's screen images are rather primitive and bear little resemblance to the highquality plotter output ChartStar produces. This disparity is more of a problem in graphics programs that, unlike ChartStar, let you move chart elements around, making it difficult to judge from the design on the screen how the finished drawing will look. Since ChartStar doesn't allow you to move elements around and relies on input forms rather than interactive design procedures, this disparity is less significant. Moreover, ChartStar puts chart elements

in reasonable places to begin with. ChartStar supports a very limited number of peripherals: the standard IBM color monitor, three Hewlett-Packard plotters. and only Epson, IBM, and IDS printers. This greatly restricts the potential market for ChartStar; MicroPro should add device drivers immediately

Also, ChartStar does not run on the PC AT. Since MircoPro does not mention this

> ChartStar can produce a wider variety of charts than many, if not most, competitive products.

fact in the documentation, the testers found out the hard way. ChartStar uses a key disk system on both hard disk and floppy disk systems. Only one copy of the key disk can be made. The AT's 1.2-megabyte drive could read the key disk and therefore start the program only about onethird of the time; the AT's 360K floppy couldn't read the key disk at all. A further difficulty occurred because although it was possible to define all the sample charts, the program refused to produce hard copy on a Hewlett-Packard 7475 plotter. A call to MicroPro confirmed that ChartStar doesn't work on the AT.

All in all, ChartStar has much to recommend it. Like any other program, it could use some additions and improvements. Though it needs many more device drivers and some further development of the on-screen graphics quality, this littleknown program is far better than many of its competitors. It would be a shame if MicroPro, by concentrating on WordStar, let ChartStar fall through the cracks.

ChartStar 1.0 MicroPro International 33 San Pablo Ave San Rafael, CA 94903 (415) 499-1200

LIST PRICE: \$295

REOURES: 192K RAM, two disk drives

STPPORTS. Video boards-IBM Color/Graphics or

compatible Printers-Epson, IDS Prism, IBM Graphics

Plotters-Hewlett-Packard 7470, 7475, 7220; Sweet-P 600

DOS versions-1.1, 2.0, 2.1 Other operating systems-none DOCUMENTATION:

Tutorial-ptu Manual-etm, idx, tes

COPY PROTECTION: kf, kdi

GENERAL GRAPHICS FACILITIES: pcf. pcd, mds

SCREEN GRAPHICS FACILITIES: 55h,

SCREEN/PRINTER/PLOTTER FACILITIES:

Hatching-mht Color choice-acc, mcc Legends-mcl, 3 Header lines-3 Comment lines-3 Note lines-none Comment position-pope Type fonts-1 Type font sizes-unlimited

Chart overlays-none Axis scaling-aas, mas Grid display-agd, mgd Tick precision-atp, mtp Page adjustment-ppu, psa

ENPUTS: Sources-ikb

Graphics formats-non Standard formats-SYLK, DIF, SuperCalc

CHART TYPES: Column charts-72 cls, 5 cgs, 5 cpg, 5 ssc, noc,

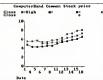
Bar charts-72 brs, 5 bgs, 5 bpg, 5 ssb, nob Line charts-6 Ins. 60 ppl. 6 tpl. 8 Ism, utl, usm. sll, fil, spl, ril, rdl Regression types-linear, exponential,

logarithmic, power Pie charts-20 psl, 20 eps, 3dp, pov, apv, epv Text word charts-4 bts, ctx, jtx Gantt charts-3 itg. 10 rog. utg. 1 smg Organization charts-2 sto, 3 tlo, vso

Bubble charts-none High-low charts-none Surface-area charts-6 Ins., 60 pls

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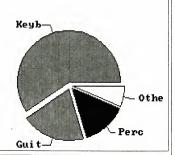


Surprisingly, this sophisticated and colorful program car not output to a plotter.

Instrument Families Used with MIDI

TOTAL

Keyb 60%
Guit 20
Perc 13
Othe 7





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| Crisp Lettering | YES | No | | | |

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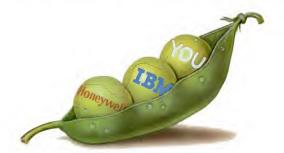
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Executive Picture Show 2.0 9120 Gramercy Dr. #416 San Dicgo, CA 92123 (619) 571-0981 CIRCLE 684 ON READER SERVICE CARD

a good look at.

Executive Picture Show deserves the Menu Congeniality award. Each menu choice is accompanied by a small, colorful icon that animates after it's selected. For example, to display a sequence of slides as a "picture show," you select the movie projector icon. It then "runs" for a few seconds and plays some musical notes before branching to that section of the program. You'll want to cycle through all the choices just to see the special effects. The terms and icons are easy to understand. In the free-form drawing section of the pro-

gram, a "worm" mode leaves an Etch-a-

Sketch trace as you draw. You can alter-

nate type fonts and other symbols and store

them in "cubby holes" defined by each

key on the keyboard. The menu, in combi-

nation with the program's intuitive termin-

ology and straightforward manual, makes

the package easy and fun to use. The focus of Executive Picture Show is its drawing option. You can use the onscreen drawing board to create slides and scenes. It allows all kinds of special effects, such as flipping objects, "floating" (animation), flashing, coloring, stretching, shrinking, and more. You can bring in and modify pictures stored on disk, including full-screen drawings and pictures of isolated objects and figures (called "vectors"). All single shapes and figures can be stretched to larger sizes or squeezed to fit into a smaller area. You can create your own figures by tracing the shape on a grid of dots. Shapes must be created in this way in order to take advantage of the full range of special effects. One caution, however: Shapes that are enlarged too much take on a low-resolution look, complete with stair-

steps and jagged edges. The package's unique "scenario" option lets you "record" a drawing session and then later show the action play by play. The graphic appears on the screen in the

same sequence that you created it. Another plus not often found in presentation graphics is slanted text. Your text can appear at virtually any slant and orientation you choose. You just enter the angle you want. Some packages can rotate text in increments of 90 degrees, resulting in four different orientations-normal, upside-down, vertical left, and vertical right-but Executive Picture Show's full-

circle rotation allows you to slant text diag-

onally. The package comes with dozens of prestored full-screen images and isolated figures. The figure libraries include scientific symbols, birds, animals, tools, machines, computers, labels, eight type fonts, and many common objects. Unfortunately, the colorful full-screen images lack that "picture-perfect" look of art-department graphics. Also, the images are inconsistent, unlike those of some other packages that create a characteristic 'look." The package does not provide off-line prints of the images for your perusal. If you want to preview the images stored on the data disks, you must load each one from the editing section of the program. At least the drawing board can provide a list, so you don't have to memo-

rize the name of each image. Despite its obvious charm, Executive Picture Show has serious limitations. Data for the standard charts and graphs can be input only from the keyboard, making the package unsuitable for those who want to graph large data sets stored in DIF formats or other files. Its business graphics section is its weakest link. It can graph a maximum of 12 values per data set and 3 data sets at once. Design options are minimal. If you want a showy graph for the picture show, you must call it into the drawing board for enhancement. The review version was plagued with such bugs as titles showing up in the wrong place and random letters appearing on the screen.

Executive Picture Show is "out of focus" in a few other places as well. The demonstration disk brought up error messages, and its interactive feature worked only occasionally. It might have helped if the package's developers had done a little more editing of their own before releasing this package-and added plotter support.

The package's flaws can be overlooked if you are in the market for a presentation graphics package, know something about BASIC, and have a limited budget. One of the most powerful features of Executive Picture Show is its interactive capability. It allows you to create on-screen slide shows that let the viewer make simple choices and branch to different slide sequences. Despite its problems, Executive Picture Show may be right on the money

LIST PRICE: \$245 REQUIRES: 192K RAM, two disk drives

SUPPORTS Video boards-IBM Color/Graphics

Monitors-IBM Color Printers-IBM Graphics; Epson FX, MX, JX; TI 855; Okidata; C. Itoh Plotters-non

DOS versions-2.0, 2.1, 3.0 Other operating systems-none DOCUMENTATION:

Tutorial-stu, otu Manual-idx

PCsoftware

COPY PROTECTION: no GENERAL GRAPHICS FACILITIES: none SCREEN GRAPHICS FACILITIES: ssb.

SCREEN/PRINTER/PLOTTER FACILITIES:

Hatching abt Color choice-mcc Legends-acl, vip Header lines-1

Comment lines-nor Note lines-none Comment position-ver Type fonts-8

Type font sizes-variable Chart overlays-none Axis Scaling-au Grid display-ngd Tick precision-ntp Page adjustment-not

INPITE Sources-ikh

Graphics formats-B-Saved scree Standard formats-none

CHART TYPES Column charts-12 cls, 12 cgs, 3 cpg, aoc, 3dc,

Bar charts-12 brs, 12 bgs, 3 bog, 3 ssb, nob Line charts-3 lns, 12 ppl, 3 tpl, 3 lsm, utl, usm

Regression types-none Pie charts-12 psl. ppv Text word charts-8 fpc Gantt charts-none Organization charts-none Bubble charts-none High-low churts-non Surface-area charts-3 lns

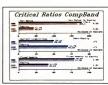


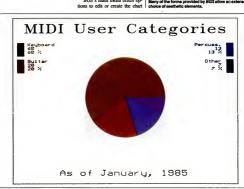
Business Graphics System

No-Nonsense Graphics for Your Business

usiness Graphics System (BGS) typifies Peachtree Software's approach to applications programs: high-quality, no-nonsense packages that allow you to create useful output quickly and without frustration. BGS deftly uses a combination of menus and fillin-the-blank forms to produce line, bar, area, pie, word, histo-

gram, and scatter charts from your data. It can also create a special chart format for displaying business ratio analyses. BGS's main menu offers op-





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PhotoMail** - Two-way Communications using pictures, text and voice.

Transmit pictures over ordinary telephone lines to remote computers. Pictures of people, diagrams, text, houses, construction sites - anything you can capture with standard video equipment you can display and transmit at resolutions up to 640 x 400 x 16 levels of gray or color. You can edit pictures with text and labels. Dual cursors permit simultaneous pointing to common pictures. PhotoMail supports alternate voice and image transmission, disk storage, and hardcopy printout. File conversion is included to support "electronic mail" systems.



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Machines Corporation.

CIRCLE 184 ON READER SERVICE CARD

PC Paintbrush outpaints PC Paint

The nemes mey sound alike.

Yet, when it comes to enhancing business graphs, creating graphic presentations, or designing greeting cards, there is only one choice. To see why, just look at the chart.

For example, notice that PC Peintbrush will run on most 320 x 200 graphics cards plus 19 higher resolution ones including the IBM Enhanced Graphics Adapter, PCjr., Tecmer Grephics Mester, and Hercules monochrome end color boards. PC Paint runs on just 3.

It's the seme with text enhancements. With PC Paintbrush, you heve e choice of 14 fonts in 15 styles (boldface, italics, etc.) end 9 sizes. With PC Paint, you get only 5 fonts and a "choice" of exactly 3 styles.

With PC Paintbrush, you have a choice of 9 different input devices (4 mice, joystick, touchscreen, and 3 tablets). With PC Paint you can use one mouse —period. PC Paintbrush supports 30 printers end plotters. With PC Peint you're limited to 3.

| PC PAINTBRUSH PC PAINT | | | | |
|------------------------|---------|---------|--|--|
| | | | | |
| Msx resolution | 720x704 | 320x200 | | |
| Compatible | | | | |
| Graphics Cards | 19 | 3 | | |
| Printers/Plotters | 30 | 3 | | |
| Input Devices | 9 | 1 | | |
| On-Screen Colors | 18 | 16 | | |
| Number of Fonts | 14 | 5 | | |
| Font Sizes | 9 | 3 | | |
| Text Styles | 15 | 3 | | |
| Drawing Line Widths | 10 | 4 | | |
| Enisrgement/ | | | | |
| Reduction | Yes | No | | |
| Slide Show | | | | |
| Presentation | Yes | No | | |
| Area Fill | Yes | No | | |
| Zoom | 2 | 1 | | |



Despite all its options, PC Paintbrush is easy to use. You have drawing tools, drop-down menus, and a range of shapes, colors and brush widths to draw with (10 widths vs. only 4 for PC Paintt).

PC Peintbrush lets you capture graphs, charts, and images from any other graphics softwere (like Lotus 1-2-3) and enhance them with text.

colors, and textures.

Compare them end we think you'li agree. There is no comparison.

So be sure to get PC Paintbrush. After all, it just doesn't make sense to paint without a paintbrush.

You can buy PC Paintbrush with a choice of mice, with a PC Teblet, or by itself. For your nearest dealer cell MicroD, First Software, Software Resources, Softeem, Software in Software Software

PC Paintbrush is a trademark of ZSoft Corporation. PC Tablet is a trademark of IMSI



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specifications and data forms, design a word chart, display graphs or word charts, and import data from Peachtree's Peach-Calc spreadsheet. From the main menu you can also reconfigure BGS; access a file-manager system that copies, renames. deletes, and otherwise manipulates files: access the on-line help system; or quit. You select options with two-character mnemonics, and each option invokes submenus. An experienced user can circumvent some of the menu steps, but BGS offers no command option system to avoid the menus altogether.

For most charts, you need to fill in both BGS forms—the chart specifications form (the Label File on the main menu) and the data form for the actual data to be plotted (the Data File on the main menu). Specifying charts and entering data is very easy

and requires little practice. The information BGS requests will vary depending on the type of chart you are plotting, but common elements include wording of the title, axes, and labels; title color; whether the final chart should be framed: and font characteristics. Seven fonts are available. You can adjust character height and width over a range of 1,000 incremental values and slant characters left or right in 1-degree increments up to 45 degrees in either direction. Many of the forms allow an extensive choice of aesthetic elements including eight colors, nine fill patterns, six line styles, and six line symbols. The program positions chart elements nicely, which is fortunate since you cannot move them later

There are other design limitations as well. Titles can be only 20 characters at most, and you can't place blocks of text on most charts as comments or notes. Line or bar charts with two different y-axis scales cannot be produced, nor can bubble, organization, multiple-pie, Gantt, or other advanced chart types.

Once BGS has the necessary design information and data, it can display the chart on the screen or output to a suitable graphics printer or plotter. The system offers you a choice of outputs as you view every chart, and no complicated gyrations are necessary to use various devices. The on-screen graphs are only fair, but

plotted output is first-rate. Plotting is

slightly slower than some other programs

because BGS fills in solid areas using very small, thorough increments.

Installing BGS is easy if your hard-copy device is a Hewlett-Packard 7475 plotter, but modifying it for a different peripheral requires a few additional steps, and the process could be confusing to most firsttime users. For example, the manual does not mention that the plotter must be connected to COM1, and there isn't any way to change the COM2 anyway. Careful study of the manual does allow you to make changes eventually.

Except for some minor confusion over installation, Peachtree's documentation is lucid and useful. A lengthy tutorial walks the new user through most major aspects of program operation. The main reference section is detailed and well written and includes a complete glossary and index.

BGS is not copy protected. Strangely, the manual does not mention hard disks, but the program seems to work fine on a hard disk AT system.

> BGS's on-screen graphs are only fair, but its plotted output is first-rate.

While the program uses the PC's cursor keys well, some of the other key usages are not standard. Hitting Return ends the entry or editing process rather than moving your cursor from field to field. Similarly, the Backspace key doesn't backspace; you must use Del instead. None of this takes long to get used to, but it's annoying nonetheless.

In spite of the limitations and restrictions, which are real and significant, BGS is a good package. It is easy to learn and easy to use. Its plotted output is excellent, and that the charts can't be made more complex is usually no limitation. Charts should be simple to communicate quickly and effectively. After all, that's what busi ness charts are for, isn't it?

Business Graphics System L02 Peachtree Software Inc. 3445 Peachtree Road, N.E. Atlanta, GA 30326 (404) 239-3000 or 239-3165

CRCLE (86 ON READER SERVICE CARD LIST PRICE: \$295

REQUIRES: 128K RAM, one disk drive SUPPORTS:

Video boards-IBM Color/Graphics, Plants Color Ph Printers-IBM Graphics; Epson MX Plotters-Hewlett-Packard 7220, 7470, 7475;

Strobe S-100, S-200; Houston Instruments 3, 4 6 7 29 DOS versions-1.1, 2.0, 2.1, 3.0 Other operating systems-CP/M (Osborne I)

DOCUMENTATION: Tutorial-ptu Manual-gtm, idx, tcs

COPY PROTECTION: non GENERAL GRAPHICS FACILITIES; pcf. ped, mda

SCREEN GRAPHICS FACILITIES: none

SCREEN/PRINTER/PLOTTER FACILITIES: Hatching-obt, mh Color choice-acc, mcc Legends-acl, none

Header lines-t Comment lines-t Note lines-t Comment por Type fonts-7 Type font sizes-1.000 Chart overlays-not Axis scaling-eas, mas

Grid display-ngd Tick precision-atp, mt Page adjustment-ppa, psa ENPLIES: Sources-ikh

Graphics forms Standard formats-ASCII. PeachCalc. SuperCalc

CHART TYPES Column charts-64 cls, 12 cgs, 32 cpg, 5 ssc, noc. 3de

Bar charts-64 brs, 12 bgs, 32 bpg, 5 ssb, nob, Line charts-5 lns, 32 ppl, 6 tpl, 6 lsm, utl,

usm, spl, rcl, rdl Regression types-linear Pie charts-12 psl, 23 eps, epv Text/word charts-7 foc. ctx. itx Gantt charts-none Organization charts-none Bubble charts-none High-low charts-non Surface-area charts-5 Ins., 32 pis



A Best Bet for Beginning Illustrators



YXEL Visuals is an unpretentious package that makes it easy to produce text or simple illustrations for pager copies, overhead transparencies, or a computer-screen side show. It is not a complete business graphics package—it won't create bar, pie, and line graphs based on your nambers, and there is no and there is not also that the program allows free-hand drawing of simple bar, column, and line graphs, with text entries in four size of page.

The PYXEL Visuals disk in-



PYXEL Visuals allows freehand drawing of aimple bar column, and line graphs.

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PYXEL Visuals 1.5 Pyxel Applications 2917 Mohawk Drive Richmond, VA 23235 (804) 320-5573

CIRCLE 675 ON READER SERVICE CARD

LIST PRICE: PYXEL Visual, \$98; BATCHPRINT, \$75

REQUIRES: 128K, one disk drive SUPPORTS:

Video boards-tBM Color/Graphics or compatible

Printers-Epson Graftrax; IBM Graphics; Star Micronics Gemini; C. Itoh Prowriter 8510 Plotters-none

DOS versions-1.0-3.0 Other operating systems-none

DOCUMENTATION: Tutorial-ptu Manual-tes

titles on a chart are not centered satisfacto-

rily, you can simply edit the lines and in-

sert and delete spaces. However, if you

then use the BATCHPRINT utility with the

same chart, the standard display font will

be replaced by proportionally spaced char-

acters, and your adjustments will throw off

the justification. Furthermore, it is difficult

to space ticks and other markers, a serious

flaw when exact plotting is needed. In all

fairness, the package has no pretensions to

these features-it is intended for text and

The SHOWTIME program lets you

display a series of screens in sequence as a

slide show. The show can be run automati-

cally, changing displays at a preset inter-

val, or so that each display can be ad-

vanced or reversed at the touch of a key.

Following the simple directions in the

PYXEL Visuals manual, SHOWTIME

was easy to get up and running. Through

BATCHPRINT, you can print out a com-

up to 24 stored files in sequence. You need

only specify the order in which the files are

to appear, set the format for printing, and

recall the composite file's name. BATCH-

PRINT does not use the same character set

as PYXEL Visuals. It prints text in the

widely-used Hershey typeface, uses pro-

portional spacing, and outputs in higher

resolution than is possible with a graphic

screen dump. The BATCHPRINT manual

offers guidelines to avoid or minimize the

problems that result when converting to

the display is stored in ASCII format, not

screen pixels. This generous capacity is

handy when grouping files for SHOW-

clear, simple menus, even a beginner can

quickly learn to produce simple visuals.

However, the manual has no index. The

sider starting with a package like PYXEL

Visuals. It's easy to learn, easy to use, and

produces nice graphic presentations for a

If you're new to business graphics, con-

program's help messages are good.

Thanks to the well-written manual and

One data disk can hold up to 42 screens because the information required to make

proportional spacing.

TIME or BATCHPRINT.

BATCHPRINT can also help you print

posite file set up for SHOWTIME.

simple line work.

It's Showtime

COPY PROTECTION: ncp GENERAL GRAPHICS FACILITIES: mda

SCREEN GRAPHICS FACILITIES: ssh asd, msd

SCREEN/PRINTER/PLOTTER FACILITIES:

FACHLITIES:
Hatching-nbt, nht
Color choice-hec
Legends-mel, vlp
Header lines-24
Note lines-24
Note lines-24
Note lines-24
Tomment position-vep
Type fonts-1
Type font sizes-4
Chart overlays-none

Axis scaling-mas Grid display-mgd Tick precision-mtp Page adjustment-ppa, hva

ENPUTS: Sources-lkb, iff Graphics formats-none

Standard formats—none
PROGRAM CHARACTERISTICS:

Design method-fsd, std User interface-30 nop, 60 top, tmu Type fonts and sizes-1, 4, 2 Pattern handling-none Drawing loobs-idr Predefined charts and images-none Other business chart formats-none lenge libraries-none

cludes a program called SHOWTIME that lets you link a series of pictures and display them on the screen in sequence. A separate utility program, BATCHPRINT, prints out a series of pictures from a composite file made through either BATCHPRINT or SHOWTIME and adds such refinements as proportional spacing. Graphics created with PYYET Visuals

Graphics created with PYXEL Visuals include up to 48 lines of test along with include up to 48 lines of test along with straight lines and simple figures (boxes, triangles, and so forth) with no fill patterns. The test comes in four sizes in either of two boldface fonts and looks goed on a dot matrix printer, better on a pen plotter. The version we tested, 1.5, prints in black only, but the new 2.0 release lets you specify one color per screen.

For each line of text, the program asks for the character size and the words. The text entity field shows a ruler-line measure of the number of characters you can enter on one line, which varies depending on your character-size selection. There is no that function, but you can create columns of titles or numbers by aligning text entries against the ruler line.

against uter tuter in the agreement in the normal screen size, you can display it in the size you specified with a simple keystroke. You can reposition the lines vertically for better design or to make room for lines or boxes.

To draw a line, you select the Line opion, use the arrow keys to position a marker at the beginning of the line, press F1, then position the marker at the ending point and, again, press F2. By repeating this process, you can draw bar charts. Jine graphs, tables, and charts showing text in box frames. The process is time-consuming, but it is easy enough to produce an

easy-to-read, neatly arranged visual. PYXEL's editing facility has some good and bad features. You can easily change words or add new lines at the end of the picture (good), but you can't insert new lines between existing lines (bad). When revising an existing line, the old line appears above the new as a guide and isn't replaced until the new line is entered (good). But when adding lines, PYXEL doesn't display the previous lines (bad).

After lining up text on the screen, you

may find additional adjustments are required before printing. If, for example, the PC MAGAZINE • JUNE 11, 1985

ing. If, for example, the relatively low investment.

20



btGRAF

Easygoing Compatibility

B

ig Trees Software's brGRAF is a plain-vanilla graphics package that provides an easy, if slow, procedure for creating x-y charts, pie charts, high-low charts, and several types of bur charts. The program is easy to use and has a limited number of options for

producing rather simple charts on

a wide variety of output devices. brGRAF comes on one disk, with an additional disk of printer and plotter drivers. The program itself is easy to install, but the documentation lacks some of the specific instructions required to install the plotter that was used for PC Magazine's tests.

Like other programs designed to run on almost any machine under CP/M as well as DOS brGRAF isn't geared to take advantage of the IBM PC's special features: It doesn't use the keynor does it allow video highlighting or movement around the screen. It can't display graphs on-screen, even with the IBM Color/Graphics Adapter and Color Dis-

play. In order to enter data you must answer a series of questions or choose menu selections that appear on the screen. Most of the screens display only one question at a time unless they are showing multiple-choice lists. Aside from the text entered for labels on a chart, all questions asked by brGRAF must be answered in uppercase letters. This annoving requirement caused a great number of data entry errors during testing. Data may be imported into the program from ASCII files. Data originating from a BASIC program is the easiest type to import. The graph definition files that are set up by brGRAF can also be easily read from

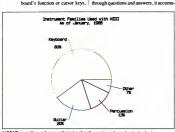
BASIC.
Though brGRAF's options are limited, it is obvious that some careful thought went into its design. As the program goes through questions and answers, it accumulates

lates information from early questions that will make the later questions more specific. One example of this is that once you have typed in legend labels and labels for groups in a bar chart, brGRAF will request data values by referring to these legend and group labels. This ability makes brGRAF

an extremely easy program to use.
The main chart tide may be up to four lines long, labels for legends and the x and y axes may be a maximum of two lines each. For column graphs, the minimum and maximum y-axis values must be specified before the data can be entered. The program will automatically label ticks on the vertical axis; these automatically death of the vertical axis, these automatically by other numbers or incertenns if you wish. The spacing of the ticks, however, cannot be changed.

After answering a number of questions, brGRAF will go through the questions a second time to confirm that all your answers are correct. You may change data or labels by typing in new values at that time. and then the program will again ask if any changes have to be made. You have, therefore, three opportunities to enter or change data. Finally, if you let all three opportunities to change entries go by, you can still change a chart's specifications through the program's main menu. Although this approach gives you more flexibility, if you are generally an accurate typist and you know what you want on the first round, the forced double-checking can seem timeconsuming. There is no way to direct brGRAF to change one particular data item without going through a whole series of questions, each of which requires some response, even if it is simply pressing Retum

Since the graph you are working on isn't displayed on the screen, you have to print or plot the graph to see how it looks. btGRAF supports at least 44 different printers and plotters, and the drivers for each come on the second floory disk. Of



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325 INC. / 3440 IRVINE AVENUE NEWPORT BEACH, CALIF. 92660 / (714) 852-9091 TELEX 380785 / ELN 62744400 MON®ROF these, up to three drivers can be copied from the driver disk to the main program disk, so you can switch between these three for printing.

PC Magazine tested the program on a Hewlett-Packard 7475A six-pen plotter. One of three chart sizes may be specified in a chart's definition: large (14 × 11 inches), medium (11 × 8 inches) or small (7½

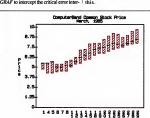
× 6 inches).
For compatibility with all machines running MS-DOS (not just the IBM compables), the program uses the DOS parallel printer output facility for output rather han using the BIOS serial interface function calls or manipulating the I/O post of the rectly. The manual doesn't explain, however, that since the Hewlett-Packard potter uses a serial port on the PC, a MODE redirection command is necessary before you can plot graphs from the serial

port. PC Magazine's testers had a problem with critical errors during plotting. Critical errors during plotting. Critical errors are those that produce cryptic messages like: "Not Ready Error Writing Devise PRN. Abort, Rerry, Ignore". Often when such errors occurred, some data would wind up being lost, and characters would appear in strange places or whole lines would go acting fort for edge of the plot. Big Trees should have programmed before the critical error inter-

rupt and deal with this problem on its own, so that data would not be lost. You shouldn't have to keep hitting R (Retry) every few minutes while you're plotting a graph.

With all these problems, it may be a while before you can extually see a correctly plotted graph. When you finally do, you will notice some problems you cannot resolve: These graphs look dull, since all lettering is done in the same font. Moreover, printing vertical labels as a column of horizontal characters looks particularly strange if the label contains parenthese or quoti-

tion marks. On the other hand, btGRAF claims some advantages that may influence your purchase decision: For example, if your office uses a lot of different equipment, but you want everyone to use the same graphics package, btGRAF comes in versions that run under MS-DOS or CP/M-86. Or, if you have a particular printer or plotter that other graphics packages do not support, perhaps it may be one of the 44 devices btGRAF supports. Also, since many graphics packages require a color monitor or a graphics card, you may be relieved to find that btGRAF will run on a monochrome display without problems. Still, we think the package is slightly overpriced at \$295 in a market as competitive as



btGRAF 2.06 Big Trees Software Corporation P.O. Box D Arnold, CA 95223 (209) 795-5104

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Piotters-Hewlett-Packard 7470A, 7475A; Strobe 100, 260; Amdek; Sweet-P, Hoasto Instruments; Western Graphtee MP1000 DOS versions-2.0, 2.1, 3.0

Other operating systems-CP/M DOCUMENTATION:

Tutorial-ntu Manual-gtm, tcs

COPY PROTECTION: nep

GENERAL GRAPHICS FACILITIES: pcf,

SCREEN GRAPHICS FACILITIES: none SCREEN/PRINTER/PLOTTER

FACILITIES
Hatching-the
Color choice-more
Lagends-mol
Header lines-4
Comment position-none
Note lines-none
Note lines-none
Type font sizes-none
Type font sizes-none
Type font sizes-none
Axis scaling-man
Grid display-mgd
Tick precision-nap
Page adjustment-pas

INPUTS: Sources-ikb

Graphics formats-none Standard formats-ASCII CHART TYPES:

Column charts-48 cis, 24 cgs, 5 cpg, 5 ssc, noc Bar charts-none

Line charts-5 lns, 36 ppl, 5 tpl, spl, rpl
Regression types-linear
Pie charts-20 pal, 20 eps, epv
Text/word charts-none
Gantt charts-none
Organization charts-none
Bigbl-low charts-24 lil
Surface-area charts-5 lns

You have to print or plot a graph in order to see how it looks.

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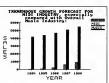


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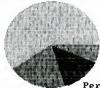
The Hypergraphics Presentation Graphics System is your key to two-way presentations. It supplies a key ingredient that is missing from other business graphics packages: interactive presentations. You can use Presentation Graphics System with its compatible authoring language, Authoring Graphics System, to produce dynamic displays of text and graphics that



ntation Graphics is a full-service business allow viewer input, such as ques- graphics package that requires no programming.

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Percussion 13%

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84 Market Survey

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Hypergraphics Presentation Graphic System 2.1 and Authoring Graphics System

Hypergraphics Corporation 207 W. Hickory, #202 Denison, TX 76201 (817) 565-0004

CIRCLE 664 ON READER SERVICE CARD LIST PRICE: Presentation Graphics, \$349; Authoring Graphics, \$395

REOUTRES: 192K RAM, one disk drive SUPPORTS:

Video boards-IBM Color/Graphics or

Printers-IBM Graphics; Epson Graftrax DOS versions-2.0. 2.1 Other operating systems—none

DOCUMENTATION: Tutorial-stu Manual-tes

COPY PROTECTION: hdk GENERAL GRAPHICS FACILITIES: pcf.

SCREEN GRAPHICS FACILITIES: ssb.

asd, med

SCREEN/PRINTER/PLOTTER **FACILITIES**

Hatching-mht Color choice-mcc Legends-mcl Mander lines 2 Comment lines-no Note lines-none Comment position-fcp Type fonts-1 Type font sizes-t

Chart overlays-2 Axis scaling-mas Grid display-ngd Tick precision-ptr Page adjustment-none

INPUTS: Sources-ikb, iff Graphics formats

Standard formats-DIF CHART TYPES:

Column charts-no Bar charts-brs unspecified, bgs unspecified, 13 bpg, 13 ssb, nob, 3db

Line charts-13 lns. 64 pol. 1 tol Regression types-none Pie charts-13 psl, epv Text/word charts-1 fpc Gantt charts-none Organization charts-none Bubble charts-none High-low charts-none Surface-area charts-13 lns

tions and choices. The authoring system costs extra, but it may be a good investment for trainers, sales and marketing departments, and others who need interactive graphics presentations.

Used alone, Presentation Graphics is a full-service graphics package that requires no programming to enhance the standard charts and graphs with prestored images, animations, and freehand drawing. The program even offers a slide-show feature. so that you don't have to hassle with 35millimeter slides. You just show your graphics right from the screen.

Live-Wire Graphics From the moment you boot up the tutorial, you see that Presentation Graphics can create some colorful, live-wire displays. The tutorial disk is one of the package's virtues because it impressively shows off the system and helps you get started. Created by both the Authoring and Presentation systems, the tutorial interacts with you by asking questions and giving

feedback to your responses. Presentation Graphics gives you threedimensional pie charts and 12 varieties of 3-D type fonts. It also offers you such features as animation, geometric shapes, color fills, free-form drawings, and predrawn images to spruce up your two-dimensional graphics. You can enter data manually or can transfer it from spreadsheet packages. such as 1-2-3, that use DIF files.

The graphing option offers the standard graphs, including bar, line, stacked bar, pie, 3-D bar, and area graphs. And once you create the basic graph, you can enhance it in various ways. The freehand drawing option lets you draw simple geometric shapes, fill and cut-and-paste images, and bring in images from other files. You can also call up and enhance such prestored images as computer objects, borders, fonts, world geography, and U.S. maps. Other prestored libraries include rather simple line drawings of standard objects. Unfortunately, most of the graphics are drawings of single objects rather than full-screen images and often lack the slick look of art department graphics.

Some problems with Presentation Graphics surfaced during the editing phase. Once when a screen was loaded for editing, erased, and then recalled the program flashed an error message (complete with a line number reference) and then abruptly exited to DOS. Another annoying quirk is that you must add the drive information to each graphic that you plan to store. The manual recommends that you place the program disk in drive A: and the data disk in drive B: so that the storage in drive B: is automatic.

The manual is definitely not as much fun as the program. It claims to be a reference manual (rather than a training manual) yet it contains no index. It would be more helpful to see a variety of visual examples that the program can create, but it shows only a few graphics. In addition, inconsistencies abound both within the manual and between the manual and the program. However, they are minor and should not cause any serious problems. The manual gives no directions for using the program on a hard disk.

Unfortunately, the software is copy protected. But this is not a serious problem

> From the moment you boot up the tutorial, you see that Presentation Graphics can create colorful, live-wire displays.

because the company includes the master disk with the basic package. The unique advantage of Presentation Graphics is that it is compatible with an authoring system that allows you to tailor the package to meet your needs and create interactive presentations. You can ask viewers questions and branch to other screens and sequences depending on their answers; they also can input choices and control the sequence of the presentation. jumping ahead or returning to previous screens as desired.

Presentation Graphics is a powerpacked program that you can coax into producing outstanding presentations, including interactive tutorials, if you are willing to invest the time and energy.

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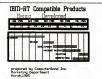
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TelePaint

Only a Preview of the Next Wave of Business Graphics

elePaint is a MacPaint clone that does MacPaint on better. Like MacPaint and other paint programs, TelePaint turns your keyboard into a paintbranh apalette so that you can draw shape on the screen, specify colors, move elements from a library into your work on the screen. But TelePaint doesn't sto there is the state of the screen and the screen. But TelePaint doesn't sto there is the screen and the screen. But TelePaint doesn't sto the transfer from a library into your work on the screen. But

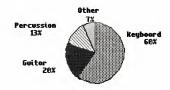
TelePaint's trump card is that it can capture any image you put on your screen from any other program, as long as that image is our-color and medium-resolu-



TelePaint's colorful images do not translate well to paper owing to severe output limitation

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BUSINESS GRAPHICS

tion, so that you can work on it with all of TelePaint's artistic tools. If the output of your business graphics package is sensible but pedestrian, TelePaint can make it lively. In combination, TelePaint's paint and image-capture features point to the next level of business graphics software.

The program requires a mouse and 256K of RAM. Installing TelePaint is simply a matter of putting the program disk into the B: drive or loading it onto your hard disk. However, the handling of data files is not as simple: The data disk must always be in drive A:. Similarly, you must copy the 16 available fonts from the program to each data disk before you use them.

Getting the Image

Capturing an image is straightforward. After you insert the TelePaint disk or go to the TelePaint subdirectory on your hard disk, you type SAVEGRAF to load the image-capture utility into memory. You can now remove the TelePaint disk, load your business graphics software, and create a graphic. Once TelePaint saves the image to disk with the extension .SC. it's

available for enhancement. Like its Apple ancestor, TelePaint uses pop-up windows, pull-down menus, and scores of icons. Two innovative features available through the menus are the ability to swap two colors on the screen and to create your own palette. You can also specify the width of your paintbrush tips and can design your own fill patterns.

TelePaint's placement feature allows you to layer design elements. You draw or place a design element in one of three modes: You place your element either over or under another image, or replace another image. This ability is extremely helpful for typing text over axes and grid lines and for incorporating symbols and pictures on a graph.

Magnification

TelePaint's Magnify option is the PC equivalent of MacPaint's Fat Bits. You use an on-screen magnification box to enlarge one small rectangular area of the "canvas" at a time. Then you can add or remove pixels to smooth jagged curves and subtly alter a line. TelePaint's cut-and-paste feature is

called Make-Stamp, which copies a portion of the screen and is then able to repeat or move that portion to other locations. The stamp has a rigid rectangular format, making it difficult to copy objects that are irregularly shaped or in close proximity. TelePaint allows you to scroll vertically to enlarge your canvas, but it cannot scroll horizontally. The limitation severely cur-

tails the enhancements of most x-v-type graphs The print selection offers the option of either full- or quarter-page prints, in a choice of either black-and-white or color. Unfortunately, the opaque, vivid screen colors appear sparse and thin on the printed page.

Some Flaws Most of TelePaint's major flaws are a reflection of its hardware and software acquaintances. Its resolution is limited by the PC's four-color, medium-resolution display, which reduces artistic finesse to

> If the output of your business graphics package is sensible but pedestrian. TelePaint can make it lively.

crude, jaggedy approximations, Controlling the mouse to draw on a medium-resolution display is like trying to thread a nee-

dle with a ball of varn. TelePaint is also constrained by the graphics program you use to create the original graph. While TelePaint can enhance the medium-resolution output of a business graphics package with text, pattems, and fill, it can't make up for the sparseness and jagged edges of a mediumresolution graphic.

TelePaint is the shape of things to come, but it is not yet fully formed. In the meantime, if your business requires a reasonably priced paint system that can double to create nice business graphics, you should consider TelePaint.

TelePaint 2.0 LCS/Telegraphics 261 Vassar St Cambridge, MA 02139

CIRCLE 662 ON READER SERVICE CARD LIST PRICE: \$149 REOUTRES: 256K RAM, two disk drives

SUPPORTS:

Video boards-IBM Colon/Graphics or compatible

Printers-IBM Color/Graphics Plotters-none

DOS versions-2.0 Other operating sys

DOCUMENTATION: Tutorisl. one

Manual-gim, tes COPY PROTECTION: nc GENERAL GRAPHICS FACILITIES: nor

SCREEN GRAPHICS FACILITIES: none SCREEN/PRINTER/PLOTTER

FACILITIES: Hatching-sht, phi Color choice-acc, mcc

Legends-vlp Header lines-no limi Comment lines-no limit Note lines-no limit

Comment position-vct Type fonts-16 Type font sizes-2 Chart overlays-no limi Axis scaling nas

Grid display-agd, mdg Tick precision-rate Page adjustment-psa

INPUTS: Sources-ikb, ims Graphics formats-any

color screen image Standard formats-none PROGRAM CHARACTERISTICS:

Design method-fsd, std User interface-13 pdm, 38 mop, 100 top, imu,

Type fonts and sizes-16 fnt, 2 fns, 2 fnv Pattern handling-40 ppa, upa, vpf Drawing tools-bbm, vpb, spc, mir, cop, idr, ist Predefined charts and images—none

Other business chart formats-none Image libraries-10 pis, sup

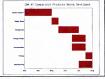


GSS-Plottalk

A Program You Can Talk To

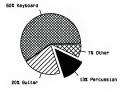
Suppose that you could have the next best thing to your own personal, full-time graphic artist: a graphics software package that understood what you wanted. GSS-Plottalk is the software version of a live graphic artist—just write your orders in ordinary English and the program will follow

your directions like a live artist.
The advantage of Plontalk is that you can communicate with it in normal, everyday language.
The program can produce a chart from the following phrases for example: "I need a chart. Make



GSS-Piottalk gives the user flexibility by easily changing graphic formats on demand.

Instrument Families Used with MIDI As of January, 1985



Source: American Music Association 1985 Market Survey Courtesy AMA ComputerBand Inc. Marketing Dept. March, 1985



Create your entire project on screen.



Unique project overview lets you see the big picture



Schedule tasks over weeks, months, even years.



-



PERS CHAST

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THAN THIS.

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can directly transfer project information into SuperCalc* 3 Release 2 and other leading spreadsheets, and produce customized reports and charts.

For more information on how SuperProject can give your project management a clear advantage, call Terry Smith at 1-800-645-3003. Or see your Sorcim/IUS dealer.

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MICRO SOFTWARE

BS Computer Associates International, Inc. offraged in a trademark and SuperCalc a registered results of Occupater Associates International, No.

SMART vs"STRONG"

UltraPAK-S™ (short for UltraPAK-SMART)

UltraPAK-S^{re} from Beng Labs is the smart buy when shopping for a monochrome graphics card for the IBM PC and compatibles. Where the "strong on graphics" card runs out of functionality, the UltraPAK-S is just beginning to pick up steam.

Lotus 1-2-3" spreadsheet in 132 x 44, VT/100 terminal emulation video support in 80/132 columns (with optional fort hit for crystal clear readshifty for 132 column applications), color graphics emulation on mon display (with separate SoftPAK II compatibility shortcard available for vitually 100% color compatibility for soft-ware packages specifying a color adapter) and much mort.

UltraRAM® memory expansion pigzyback and (384 K) and UltraPAK Diskmaster® software with print spooling to use with our standard printer point thousands of smart corporate end-surnhave standardized on the UltraPAK-Sower thousands of smart corporate end-surnhave standardized on the UltraPAK-Sower features, in addition to our hieres monochrome graphics (720 x 345) which are car course compatible with the "strong of UltraPAK-Sower Sower Sower Sower Sower Sower UltraPAK-Sower Sower Sower Sower Sower Sower UltraPAK-Sower Sower Sow

tion software or any kind of monochrome graphics, give us a call and find out what our customers found out...That the smart decision pays every time. Systems Supported: IBM PC, IBM PC/XT, IBM PC/AT, ITT XTRA*,

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AT&T™, Compaq Portable™, Eagle PC Spirit Portable™, IBM PC Portable.

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BUSINESS GRAPHICS

the background blue. The data is 10, 15, 20. Please draw it for me now." A line chart on a blue background will appear.

To make changes, continue 'talking' to the program. "Give it a neat title like First Quarter Software Sales, and show it to me as a nie chart. Go with that." A second graph, a pie chart with three slices and a title, will instantly appear.

You can keep trying new directions. "The data might look better as filled bars. Please label the r-axis 'lan' 'Feh' and 'Mar.' and draw it for me that way." The program responds by producing a column chart complete with labels. Thus in 2 or 3 minutes, you can create several charts.

Plottalk Talks Rock

Plottalk allows a great deal of flexibility in how you word commands. It lets you rephrase your directions until you are satisfied with them, and if you leave out some information needed to plot the graph, Plottalk lets you know. Once it understands what you've typed, it "echoes" the essence of your request back to you. Using the echo feature may be the quickest way to learn the actual program commands. On the other hand, Plottalk simply ignores requests it can't make sense of, leaving it up to you to make sure that all the elements you've entered have been echoed.

Plottalk lets you decide how much decision making you want when choosing chart options. In most cases, if you don't specify an option, Plottalk has a full array of default settings that you can rely on. It creates a line chart when no chart type is specified and can also adjust the size of the graph to accommodate a subtitle that you might want to add at the last minute. If you want to further refine the chart, you can choose from 12 type fonts and 25 type sizes. Plottalk lets you place up to 20 text messages anywhere on the chart

Only memory size and display-screen capabilities limit how much data Plottalk can handle. You may either enter data from the keyboard or import it directly from standard-format database files. You may also type all the directions for creating charts on a standard word processor, then

transport those files directly into Plottalk. To start, you must use one of Graphic Software Systems' 25 GSS-Drivers so that the program can communicate with your

printer or any other peripheral devices. The GSS-Drivers follow a graphics standard called Virtual Device Interface (VDI), which is one of several interfaces vying for position as the industry-wide graphics standard. Among other things, GSS-Drivers allow you to save Plottalk

charts as "metafiles" that can be read by mainframes and minicomputers unable to run Plottalk itself.

To use Plottalk, you must first install the device driver. The directions are minimal and assume a working knowledge of DOS commands and formats; you'll get stuck if you don't know when to use the left-slanting slash and when to use the right. The startup requirements are so much more difficult than the easy-to-use program that it makes you wonder why the company brought the program out without adequate installation software. GSS says that when it completes the installation soft-

ware, it will distribute it with the package. The manual is well organized, clear, and easy to use. It has a comprehensive index, an appendix explaining error messages, plus a glossary of graphics terms and Plottalk commands. The manual shows a number of sample graphs with instruction sets for producing them. Each section starts with an overview, summarizing the main points in plain English.

The one area in which the manual falls short is in not listing range values for the various commands and options, though you'll find a helpful list of default values for each command in the appendix. It took a call to the company to find out that you can display a virtually unlimited number of bars in one bar chart and overlay 20 sets of data in any one chart. And somewhere in the manual it should say that there are no limits on the amount of data that can be input (other than the limits imposed by the hardware you are using).

For those who have avoided doing their own business graphics because they didn't want to bother learning how to use a graphics package, Plottalk may be well worth its price-once the installation software is added. Here's the straight talk about Plottalk: it's elaborate enough for extended data sets and chart types, yet extremely easy to use. It's hard to imazine how graphics software could be made any mor "user-friendly."

GSS-Plottalk; GSS-Drivers 1.00 Graphic Software Systems 25117 S.W. Parkway Wilsonville, OR 97070 (503) 682-1606

CIPICLE 667 ON READER SERVICE CARD

LIST PRICE: \$295 (including GSS-Drivers) REQUIRES: 256K RAM, one floppy disk

Video boards-IBM Color/Graphics Printers-IBM; IDS Prism 80, 132, 480; Datasouth DS 180; Epson MX; Diablo 150; Hewlett-Packard 2225C; NEC 7730, 3550 Okidata Microline series: OMS Laser Grap 800: Toshiba Pt350; Anadex 9501; Printr

MVP; Qume Sprint 11; Seikosha GP-700 Plotters-Hewlett-Packard 7470A, 7474A 7550, 7475A, 7585, 7586; Strobe 100, 200,

260: Amdek Amplot II; Houston Instrur DOS versions-2.0, 2, t, 3.0

Other operating systems-UNIX DOCUMENTATION:

Tutorial-otu Manual-gtm, idx, tes

COPY PROTECTION: ncp GENERAL GRAPHICS FACILITIES: none SCREEN GRAPHICS FACILITIES: nor

SCREEN/PRINTER/PLOTTER FACILITIES:

Hatching-aht, mht Color choice-acc, n Legends-acl, mcl, vlp Header lines-2 Comment lines-20 Note lines-20 Comment position-vcp

Type fonts-12 Type font sizes-25 Chart overlays-20 Axis scaling-eas, mas Grid display-agd, mgd

Tick precision-atp, ntp Page adjustment-ppa, hua, psa INPUTS: Sources-ikb, ims, ipt

Graphics formats-none Standard formats-DIF, ASCII CHART TYPES:

Column charts-cls unlimited, cgs unlimited, cpg unlimited, 20 ssc, noc, npc Bar charts-brs unlimited, 20 bgs, bpg

unlimited, 20, nob, npb Line charts-20 lns, 500 ppl, 5 tpl, 6 lsm, sll,

Regression types-none Pie charts-16 psl, 16 eps, eps Text/word charts-12 fpc, 6 bts, ctx, itx, btx Gant charts-its unlimited, rog not specified,

utg, 8 smg Organization charts-no Bubble charts-none High-low charts-none Surface-area charts-20 lns

PC MAGAZINE • JUNE 11, 1985



Plotrax 2

Sophisticated Regression Analysis

oes your need for statistical analysis outweigh your need for pretty charts? If it does, you should look at Plotrax 2. Engineering Science's graphics entry offers an unusually wide array of statistical capabilities in a presentation graphics program that is otherwise mediocre when measured against the competition.

Plotraz 2 offers a fairly standard mix of business charts, plus a powerful, well-documented regression package that includes output statistics more normally associated with standalone statistical packages.

The menu-driven program supports only the Hewlett-Pack-ard 7470A plotter, but can produce graphic output on a wide variety of popular dot matrix printers. The main menu lets you select line graphs, scatter graphs, and the property of the plotter of printers.

tics. You can enter data manually, load a previously created data file from disk, or use a special program to translate DIF files into Plotrax 2 format.

Manual data entry is accomplished in a table format that is easy to edit, although the program requires some unusual key combinations to move from field to field. For example, to move back to the previous field, you must hold down the Ctrl key and the plus sign (+) key, and at the same time press the back arrow key.



ple charts, but charts, or the same payaris. For every a great arms a point successing appears for every and the same payarisms. Instrument Familiae Used with MIDI

Ploraz 2 offers some interesting options. When creating three-dimensional bar charts, for example, you can indicase the width and depth of the bars (zero depth results in two-dimensional burs), as well as the spacing between them. However, the program does not save you from entering depths and widths that can render a chart unreadable. A nice touch in 3-D bar charts is the use of slamted letters and numbers that follow the perspective of the bars.

When creating line and scatter charts, you enter the x and y values. Plorar can either plot the data for you, compute one of a variety of regression analyses, to both been though this feature is Plorax's most powerful and sophisticated, its menus and asysto-follow outputs make the usually onerous chore of statistical analysis and plotting almost pleasant.

To create pie charts, you can indicate which wedge should be exploded, what patterns to use, and whether percentages should be displayed. But the program places the labels for the pic chart in odd places in the appropriate wedge. These labels can be moved around by using the arrow keys, but it is a cumbersome process.

Printing the Charts

As in all the modules, once this information is entered, you can view the chart on-screen by pressing the End key. To output to a dot matrix printer, you then press PrtSc. You can use the Hewlett-Packard 7470A two-pen plotter and change pens between each color plot.

The program comes with several files and a tutorial in the manual. The manual is adequate but has no index. The program is fairly simple to learn.

For those who need its statistical features, Plotrax 2 is a good buy. However, there's nothing particularly outstanding about its performance for business graphics, and its lack of flexibility and wide plotter support takes away much of its appeal as a presentation graphics package. Plotrax 2

Engineering Science, Inc. 57 Executive Park South, NE Suite 590 Atlanta, GA 30329

(404) 325-0124 CIRCLE 668 ON READER SERVICE CARD

LIST PRICE: \$340 REQUIRES: 256K RAM, two disk drives

REQUIRES: 256K RAM, two disk drives SUPPORTS: Video boards-IBM Color/Graphics, Frederick

Electronics Printers-Epson, IDS Prism, IBM Graphics, Okidata

Plotters-Hewlett-Packard 7470A

DOS versions=2.0, 2.1 Other operating systems=none

DOCUMENTATION: Tutorial-ptu Manual-gtm, tes

COPY PROTECTION: hdk
GENERAL GRAPHICS FACILITIES: pcd
SCREEN GRAPHICS FACILITIES: pcd

SCREEN GRAPHICS FACILITIES: none SCREEN/PRINTER/PLOTTER

FACULTIES: Hatching-mht Color choice-nec Legends-acl, vlp

Header Ines-1 Comment lines-none

Note lines—none Comment position—none Type fonts—1

Type font sizes-1 Chart overlays-none Axis scaline-nas

Grid display-ngd Tick precision-ntp Page adjustment-none

INPUTS:

Sources-ikb Graphics format-none Standard formats-DIF

CHART TYPES: Column charts-19 cls, 19 cgs, 4 cpg, moc, 3dc

Bar charts—none Line charts—8 lns, 23 ppl, 1 tpl, 10 lsm, sll, fil,

spl, rel, rdl Regression types-linear, exponential, power, logarithmic, inverse, polynomial

Pie charts-22 psl, 22 eps, ppv Text/word charts-none Gantt charts-none

Organization charts—none Bubble charts—none High-low charts—none Surface-area charts—8 Ins How Do I
Choose the
Right Personal
Computer
Monitor?





PC-Graph

Limited Graphics at a Not-So-Inexpensive Price

im Button's Buttonware has grown from a garage hobby venture to a fairly large operation, and it has earned a reputation for selling some fine software at very affordable prices. PC-Graph, a graphics package that can boast of neither fine graphics nor an exceptionally fine price, breaks

with this tradition, however,

PC-Graph was created to offer PC-FILE III users an easy-touse graphics supplement. Indeed, the package is easy to use when it works. However, when it does work, the results are so simplistic that it's hardly worth the trouble. The list of what you can't do with PC-Graph far exceeds the list of features. For all but the few lonely souls who "fit the PC-Graph bill" this program is just not usable.

First. PC-Graph will only

Buttonware's PC-FILE III. It cannot accommodate hand-entered data or data from other formats. Second. PC-Graph can only do simple line graphs. No pies, no bars, no columns-just points connected by lines. Also, the program will only graph one field from the PC-FILE database. This restriction makes correlating relationships between data out of the question. There are similar packages that do allow you to specify multiple data fields in the same graph, but not PC-Graph. And in order to graph part of a database instead of the whole thing, you must return to PC-FILE and generate a database report that contains that information. PC-Graph graphs all or none of the specified file.

PC-Graph's confining environment obscures its few redeeming features. Still. it is extremely easy to use. Using function keys and on-screen menu selections, you choose a database file, specify the data field you want to graph, and configure the size of the graph and its minimum and plot data that originates from maximum values. The graph appears im-

mediately on the display screen. Because you can fully control the size and position of a graph on the screen or paper, you can integrate your graph into a presentation.

Once you've displayed your graph, you enter the labeling component, the only flexible part of the program. In text mode you can type characters anywhere on the screen. Ironically, you can create attractive multiline titles and comment and note fields for your unimpressive line graph.

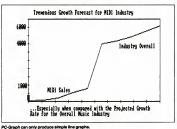
Graphics-package design usually entails trade-offs between simplicity and high-quality output. PC-Graph is simple to use, but the limitations incurred for the sake of simplicity appear in the output. The graphs are not presentation-quality. The lines that connect the data points are jaggedy and look like steps. The program doesn't accommodate print symbols to mark data points for accuracy. The limits on the selection of fonts, vertical scaling, graph types, and types of data can almost defeat you.

Its restrictions do not make PC-Graph an especially robust program. Three different PC-Graph program disks run on three different IBM and compatible systems all failed at times and exhibited unexpected error messages.

Not Much Support

However, PC-Graph's most heinous crime is lack of user support. Because Jim Button got so many phone calls from users, he stopped helping them personally. He claims that hiring someone for telephone assistance would drive his prices up. Instead, he suggests you write a letter to Buttonware about your problems; that reflects a Pony Express mentality.

Buttonware can no longer claim to make the best product for the lowest price. PC-Graph has not been properly debugged, and support is difficult to obtain. The graphs are unattractive and limited. Even PC-FILE users would be hard pressed to find uses for these graphs.



PC-Graph 1.0 Buttonware P.O. Box 5786 Bellevue, WA 98006 (800) J-BUTTON (for orders) (206) 746-4296 (for information)

CIRCLE 874 ON READER SERVICE CARD

LIST PRICE: \$47

REQUIRES: 192K RAM, one disk drive

SUPPORTS: Video boards-IBM Colon/Graphics or

Printers-Epson Graftrax; IBM Graphics Plotters-none

DOS versions-2.0, 2.1 Other operating systems-none

DOCUMENTATION: Tutorial-ptu Manual-idx, tes

COPY PROTECTION: ncp GENERAL GRAPHICS FACILITIES: none

SCREEN GRAPHICS FACILITIES: none SCREEN/PRINTER/PLOTTER

FACILITIES: Hatching-nht Color choice-ncc Legends-mcl, vlp

Header lines-unlimited Comment lines-unlimited Note lines-unlimited

Comment position-vcp Type fonts-1 Type font sizes-1

Chart overlays-none Axis scaling-aas, mas Grid display-mgd

Tick precision-stp, mtp Page adjustment-none INPLITS:

INPUTS: Sources-none Graphics formats-none

Standard formats-PC-FILE III

CHART TYPES:
Column charts-none
Bar charts-none

Line charts-1 Ins, 1,000 ppl, 1 tpl, 1 Ism Regression types-none

Pie charts-none Text/word charts-none Gantt charts-none

Organization charts-none Bubble charts-none High-low charts-none Surface-area charts-I Ins

Will It Work with My PC?

Before you can experience the full capabilities a high performance monitor offers, it has to work with your personal computer. That's why Princeton Graphic Systems makes high resolution monitors compatible with most popular brands of personal computers. IBM, Compaq, Corona, Apple and more. But we go one step further. By paying close attention to ergonomic detail, we make Princeton Graphic Systems monitors compatible with you, the computer system user...





PFS:GRAPH

Economy and Elegance

FS:GRAPH is the economy car of business graphics-no frills and no fuss. For high value at a low price, it's hard to beat. The easy-to-use package delivers standard business graphs with very little start-up cost in time and money. The beauty of this package lies in its simple-but-elegant menus. Even a novice can begin to create business graphics within minutes.

> This no-nonsense workhorse includes all the necessary functions needed for standard graphics: input the data, specify and design the graph, display graphs on the screen, print or plot graphs to a variety of output devices, and save graphs on disk. Line and bar graphs may be combined in a composite graph, and up to four graphs may be displayed on one page.

At this price, you expect some

limitations. The available design features just don't compare to the bells and whistles found in more sophisticated graphics packages. For example, text can be displayed in only one font and size. Fill patterns, colors, and point symbols are automatically controlled by the program. But you can make decisions about the use of grids, axis labels, use of color or black and white, titles, minimum and maximum axis values. and horizontal and vertical orientation of text. So you do have some say.



graphics with a minimum of tuas.

PFS: GRAPH outputs good, basic busine

Instrument Families Used with MIDI As of January, 1985 Other (710)

Another drawback of PFS:GRAPH is that its data-handling capacity is somewhat limited. It can graph only four series (or data sets) with 36 data points in each. That means, for example, that you could graph only 3 years of your monthly sales figures. Or you could compare sales, gross expenses, and profit with only one other factor. It could be very limiting if you need sophisticated, complex graphs.

PFS:GRAPH is good for beginners. The manual includes an easy-to-follow tutorial that is hardly necessary; a few minutes spent experimenting with the menu is more fruitful. If you are confused, an online help option is often available at the press of a key. And the program meets any errors with feedback and a reference to the appropriate section in the manual.

One special feature of this program is the ease with which you can modify graphs. PFS-GRAPH's menu structure makes it simple to change any aspect of the graph. The reconfigured graph can then be instantly redisplayed on the screen.

Another advantage is that PFS:GRAPH belongs to a family of compatible PFS products, which means you can input data from the spreadsheet (PFS:PLAN) and database (PFS:FILE). You can also transport and print a graph as part of a PFS:WRITE document. It's like an integrated package with each part marketed separately so you can pick and choose the packages that you want. PFS:GRAPH also allows data input from a variety of other database and spreadsheet software.

The package supports a variety of printers and plotters. Again, the menu makes output easy-no frustrations with "installing" a printer. However, even though the HP 7475A is listed in the menu, we still had trouble outputting to it

For occasional users of business graphics and those who have no desire to wade through manuals, PFS:GRAPH is a real find. It's a no-nonsense product at a nononsense price.

PFS:GRAPH Software Publishing 1901 Landings Drive Mountain View, CA 94043 (415) 962-0191

CROLE 699 ON READER SERVICE CARD

LIST PRICE: \$140 REQUIRES: 192K RAM, two disk drives

SUPPORTS: Video boards-IBM Color Graphics, Hercules

Graphics
Printers-IBM Graphics, Color, Compact; Epson
MX, FX, RX, LQ, Hewken-Packard Thinklet; C.
Itoh 8510; NEC 8023; IDS Prism; Okidata
Microline; Quadram Quadjet; Texas
Instruments 800, 855; Toshiba P1340;

Transtar 315

Plotters-Hewlett-Packard 7470A, 7475A,

Strobe M-260, Sweet-P; Amdek Amplot II;
Houston Instruments DMP29, DMP40,

Houston Instruments DMP29, DP DMP40-2; IBM 2 pen, 6 pen DOS versions-1.1, 2.0, 2.1 Other operating systems-none

DOCUMENTATION: Tutorial-ptu Manual-idx, tcs

COPY PROTECTION: lef, hda

GENERAL GRAPHICS FACILITIES: mda SCREEN GRAPHICS FACILITIES: aab (Hercules)

SCREEN/PRINTER/PLOTTER

FACILITIES: Hatching-aht Color choice-acc Legends-acl, none Header lines-al

Comment lines-0 Note lines-0

Comment position-none Type fonts-1

Type font sizes-1 Chart overlays-4

Chart overlays-4 Axis scaling-aas, mas Grid display-mgd Tick precision-mtp

Page adjustment-ppa (printer)

INPUTS: Sources-ikb

Graphics formats-none Standard formats-DIF, SYLK, other PFS series

CHART TYPES:

Column charts-64 cls, 4 cgs, 16 cpg, 4 ssc, noc

Bar charts-none Line charts-4 lns, 16 ppl, 1 tpl, 4 lsm

Regression types—none
Pie charts—8 psl
Text/word charts—none

Gantt charts-none Organization charts-none Bubble charts-none

High-low charts-none Surface-area charts-4 lns, 16 pls

Does It Give Me A Bright, Sharp Image?

Take a close-up look at the display. Bright, crisp characters and sharp, colorful graphics mean you're getting a high-quality image. The kind of image that comes with every Princeton Graphic Systems' monitor. Because Princeton Graphic Systems combines flicker-free technology, a fine dot pitch, and a nonglare screen to give you an image that PC World's World Class Survey rates number 1...





GRAFIT

Especially for Scientists

oken Software's GRAFIT is the business graphics part of a threeprogram package that might appeal most to scientists and engineers working in mining, geotogy, and archeology. The other two programs, 10°PO. Or contour mapping, and 3 N.PP. for producing the producing of the protour of the protour of the producing of the protour of the

GRAFIT, which is menudriven, allows you to choose from several chart types, including bar, stacked bar, pie, and line. The menu is designed in a format similar to that of Lotus's 1-2-3—that is, you can select a command either by pointing to it no-screen and pressing Enter or simply by pressing the first letter of the command name. There are two methods for entering data into GRAFIT. One is to enter the desired data points from the keyboard manually. Alternatively, the program can read data from any text editor that produces ASCII files. Each line of the imported data file must contain one pair of coordinates (x,y) expanded by a table of a comma, and text data must be set off with double quotation marks.

These two entry methods can be combined on one chart. For example, you could enter the information for data set A from the keyboard and have the program import the information for data set B from an external file. Unfortunately, you cannot edit data once it has been entered. If you made an error entering the fourth data point, for example, you would have torentery our data starting with the first point.

You can take a look at your chart any time by choosing the View command from the main menu. You cannot edit the chart itself; all editing is done from the main menu. However, GRAFIT offers a variety

of options for fine-tuning your chart once the basic information has been entered. The Options menu allows, you to adjust the length and label spacing for the x and y axes, as well as indicate the label format, that is, whether numbers should appear as dollars, percents, or in scientific notation.⁵ You can add a title to the chart (pri You can add a title to the chart (pri you can add a title to the chart (pri you can alway the control of the chart of the your can alway the chart of the chart of the form 15 fort character ets. but you can also select

Once you're ready to print the chart, the data must be saved to disk. You then exit GRAFIT and run PLOTCALL. First you must prepare your chart file for PLOTCALL by entering PC followed by the licename and a semicolon. Finally, you plot the chart by typing PLOT followed by the filename without a semicolon. You must set up PLOTCALL for your printer with the

mix these sets within a chart.

installation program.

The quality of the final printout will vary, depending on the brand of printer used and the font sets you have chosen to use. GRAFIT and PLOTCALL do not drive pen plotters.

GRAFIT requires no special installation and is not copy protected. The package does not contain a tutorial, but a demonstration chart file is included that, when combined with the crisp, clear style of the documentation and the program's relative simplicity, is sufficient to teach you the program thoroughly.

GRAFIT's main shortcomings are that it omits an editing facility for data entry and requires a separate program to print hard copy. Also, it outputs to dot matrix printers only, a minus if you want to use a color plotter for your graphits. Its real strength lies in the fact that it comes packaged with contour mapping and three-dimensional surface plotting programs—nice bonus for those who need these more-scientific graphing features.



GRAP // Is more suitable for scientific applications than most graphics program

GRAFIT 1.00 (with PLOTCALL, TOPO, and SURF)

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LIST PRICE: \$199 REQUIRES: 128K RAM, one disk drive

SUPPORTS: Video boards-IBM Color/Graphics or

compatible
Printers-Epson and compatible; Okidata; IDS
440, 460, Prism: Texas Instruments 850, 855;
Anadex 9620, Star Micronics; C. Itoh
Prowriter, 8510; NEC 8023; Mannesmann
Tally MPI 150; Toshiba 1340, 1351

Plotters-none DOS versions-2.0, 2.1

Other operating systems—none

DOCUMENTATION: Tutorial-ntu

Manual-tes COPY PROTECTION: hep, hda GENERAL GRAPHICS FACILITIES: non SCIPPEN CRAPHICS FACILITIES: non

GENERAL GRAPHICS FACILITIES: none SCREEN/PRINTER/PLOTTER

FACILITIES: Hatching-mbt

Color choice-ncc Legends-mcl Header lines-1

Comment lines-none Note lines-none Comment position-none

Type fonts-1 Type font sizes-1 Chart overlays-1

Axis scaling-nas, mas Grid display-mgd Tick precision-map

Page adjustment—none

Sources-ikb Graphics formats-none Standard formats-ASCII

CHART TYPES

Column charts-15 cls, 5 cgs, 15 cpg, 5 ssc, nox

Bar charts—none Line charts—5 lns, 15 ppl, 1 tpl, 5 lsm Regression types—none

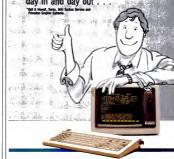
Pie charts-psl unspecified, ppv Text/word charts-none

Gant charts-none
Organization charts-none
Bubble charts-none

Bubble charts-none High-low charts-none Surface-area charts-5 Ins

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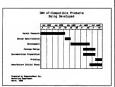
BUSINESS GRAPHICS

Graphwriter

Big and Powerful for Heavy-Duty Use

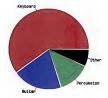
raphwriter from Graphic Communications. Inc., falls on the powerful end of the business graphics program scales. Written in UCSD Pascal, Graphwriter uses a staggering number of overlays. The result is a massive package that comprises 290 programs spread over ten floppy disks. On a floppy disk system, you'll have to insert disks with proper chart formats as needed. On a hard disk system, Graphwriter will occupy 21/4 megabytes of disk storage.

Installing Graphwriter on a formets offers 11 sec



er's Basic Set of predefined graph

Instrument Families Used with MIDI As of January, 1985



Source: American Music Association 1984 Market Survey Courtesy AMA

Prepared by ComputerBand Inc. Marketing Department Harch, 1985

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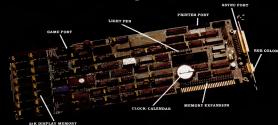
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Graphwriter 4.21 Graphic Communications, Inc. 200 Fifth Avenue Waltham, MA 02254 (617) 890-8778

IRCLE 665 ON READER SERVICE CARD

LIST PRICE: \$395/\$595 REOURES: 197K RAM, two disk drives

REQUIRES: 192K RAM, two disk dr. SUPPORTS:

Video bourds—any monochronic (no graphs on screen) or IBM-compatible color/graphics Printers—Hewlett-Packard ThinkJet; IBM Graphics; Epson MX, FX, RX; Dataproducts

Prism: Okidata M82, M92; IDS Prism Plotters-Hewlett-Packard 7220C, 7470A, 7475A, 7550A; IBM XY/750; Calcomp M84; Mannesmann Tally Pixy 3; Houston

Instruments DMP29
DOS versions—2.0, 2.1, 3.0
Other operating systems—none

DOCUMENTATION:

Tutorial-ptu Manual-gtm, idx, tcs

COPY PROTECTION: lcf, hdk GENERAL GRAPHICS FACILITIES: pcf.

ped, mdk SCREEN GRAPHICS FACILITIES: none

SCREEN PRINTER PLOTTER FACILITIES: Hatching-ahi, mhi

Color choice—acc, med Legends—acl, mel, vlp Header lines—3 Comment lines—3

Note lines-3 Comment position-vep Type fonts-8 Type font sizes-unlimated Chart overlays-none

Axis scaling-aas, mas Grid display-ngd Tick precision-utp, map

Page adjustment-ppa, hva, psa INPUTS:

Sources-ikb Graphics formats-no

Standard formats—SYLK, DIF CHART TYPES:

Column charts—36 cls, 20 cgs, 8 cpg, 16 ssc, noc, nvc, npc Bar charts—36 brs, 20 bgs, 8 bpg, 16 ssb, nob.

nvb. npb Line charts-8 Ins., 100 ppl, 8 tpl, 6 ism, vtl, usm,

sll, fll, spl, rcl, rdl Regression types-linear, exponential, power,

log
Pie charts-16 psl, s-216 eps, ppv, epv, uap
Textword charts-2 fpc, 6 bes, ext, jex, bex, utx

Gantt charts-49 itg, 20 rog, utg, 6 smg Organization charts-48 smo, 80 clo, 72 sto, 3 ito, vso Bubble charts-36 bbs, 20 cpb, lib,ldb, lib

Bubble charts-36 bbs, 20 cpb, lib,ldb, lib High-low charts-none Surface-area charts-8 lns, 100 pls

hand disk is a quirly enough process to be choldeding for a novice PC user. If you create a subdirectory on your hard disk for the Caphwriter files and then switch to the Adrive to start installation, the procedure will abort. What the manual docsn't explain is that Graphwriter's installation program automatically creates a subdirectory in which all the files are placed. Nor does it tell you that you are really going to need 2½ megabytes of storage. Once these yearmount of the process of storage on the contraction of the process of storages of the contraction of the process of storages. Once these yearmount of Thand disk went smoothly, with the process controlled by automatic batch files.

Graphwriter is copy-protected, and only one floppy copy can be made. This copy or the original master disk must be in a floppy drive while the program is used from a hard disk.

Graphwriter is completely menu-driven. You enter data and specify layouts by answering the program's questions. Complete context-sensitive, on-line help can be obtained at any point by hitting a key.

most similar programs. Graphoriter requires quite a lot of information to make even reasonably simple charts. However, input forms make entering the information and are obviously intended for a serious business environment. Because of Graphoriter's design, which relies on a complex composition function to lay out the charts before plotting, the program lacks an interactive interface.

The formats themselves range from very good to excellent. Your range of control over even simple bor, line, and pie charts is impressive, at least in terms of annotation, shading, titiling, and the like. Many chart elements can be repositioned, but to do so you must specify locations in numeric coordinates.

Graphoritor is from the prakfinck Besin and school of graphics programs. Besides Get offers 11 formats; another 12 come in the Estension Set. The formats in the Basic Set produce the normal run of bar, pie, line, and scatter gaptas, with some interchart format allows up to four pies, which chart format allows up to four pies, which can be drawn in different sizes to show special relationships. Especially noteworth by is the text-wood-thart format. Externsplice subsystem that outperforms some standalone text dart packages.

The Extension Set formats let you combine simpler charts in new ways and offer some relatively unusual charts. Graphwriter is one of the few packages to produce Gantt, organization, and bubble charts. The organization chart format could almost be sold on its own. It is quite complex and requires some study, but once mastered, even complex organization and flow charts can be produced.

You can list plot to a color/graphics screen to preview your chart layout.
Graphwriter can produce a fast plot without feel lito save time. It also has an interesting option that prints graphics without
ext, in case you want the text typeset and
stripped in later. The system calls for both
narrow and wide pens on a 1-levelt-Packard 7475 plotter, using the wide pens for titles and area fill.

Graphwriter's documentation is extremely detailed and comprehensive. Although the manual is well organized, it isn't tabbed. Graphwriter is a big system. While it is

very fast on a hard disk AT, it can be sluggish on floppy-only systems. Its batch nature and sophisticated compositon methods produce first-rate charts, but some users may prefer a more interactive environment.

Graphwiter is extremely flexible, yelly appropriate a surprisingly case to use. Its output just is superb, and it offers charts most competitive products do not have. It is not inexpensive, but buying both format sets to-gather brings in price into line, especially subsequently one compare it as the cost of baying separate textwood or organization chart software. Judging by its performance, Graphwiter is an excellent product worthly of serious consideration.

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Graphics: A Two-Edged Sword

Use these power tools skillfully, or the impressions you create may be other than you intended.

B

usiness graphics can put you at the cutting edge of information management, even if you are unable to draw a straight line or don't know an eased from a pixel. For only a few hundred dollars, graphics software packages will transform your PC into an art department that can generate colorful charts and graphs, custom drawings, professionally rendered images, and even screenbased slide shows.

Graphics software can help you cut through to the heart of a message, making an impact that no amount of verbiage or data can match. People remember what they see but forget or filter out much of what they hear and

Graphics can also let you condense mounds of data into manageable patterns and useful information. According to some experts, the quantity of scientific and

technical knowledge is now doubling every 5½ years. And soon the rate will jump to perhaps 40 percent each year, meaning that data will double every 20 months. To volume of information, one corporate vice president now uses business graphics to summarize monthly reports, saving himself the tedium of studying 150 pages of data each month.

Business graphics can even help the bottom line. In a recent survey, over 40 percent of computer graphics users reported an increase in revenues attributable to the use of business graphics.

Imagine yourself sitting in a presentation given by your colleague who is the product manager for Free Time, a hypothetical time management software package with impressive sales growth. Your colleague begins with a slide of a businessman reading a newspaper with the headline "Sales of Free Time Double Monthy." The next slide dresses up a har chart

terest and keeping you focused on the topic of time management software. Remember, though, that while clever presentations will hold your interest, a too-cut graphic may turn you off and leave you feeling that the entire presentation was silly. On the other hand, visual puns and cut touches may work well for some groups. It's important to know your suddency.

with images of time, adding in-

Because images carry great impact, business graphics can weaken your credibility if you're not careful. The colors you choose for your graphics can have a tremendously positive im-



PC MAGAZINE ● JUNE 11, 1985 239

pact or just as easily have a negative ef- | fect-something I learned the hard way. As part of the opening sequence of slides during a presentation, I showed a multicolored map of Canada with the northern part

of the U.S. visible. At the end of the presentation, a member of the audience dressed in full military uniform came up to me, indignant that the United States had been shown in red during the opening.

Another possible mistake is graphic distortion of your data, which could lead to poor decisions with disastrous consequences. One or two simple changes in a graph can make the same data convey very different messages. For example, squeezing the x axis of a graph on floppy disk sales gives the impression of sharp growth after a big dip while stretching it conveys slow growth. Distorted graphics can mask the facts, leaving you worse off than you were with piles of printouts.

What's on the Market

If you want to succeed with business graphics, you should learn as much as you can about the software capabilities and bolster your "visual IQ." One way to do this is by reading books and articles on the topic to give you an unbiased bird's-eve view of various business graphics pack-

There are different types of business graphics packages and they may be used in different ways. Decision-support graphics

> While a clever presentation will hold your interest, a toocute graphic may turn you off.

programs help you analyze trends and make better decisions. Presentation graphics packages can create slides, transparencies, and hard-copy output to accompany your presentations, reports, and business meetings.

Most of current PC graphics software is geared to creating presentations and involves several main types:

- charts and graphs
- drawing and painting
- predrawn images of "clip-art" screen slide shows
- enhancement software
- output and device drivers. Business graphics packages always can produce charts and graphs, allowing you to

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BUSINESS GRAPHICS

create automatically the standard formats for portraving data that we're all familiar with-bar graphs, pie charts, and line graphs. More and more integrated packages are adding graphics to their spread-

sheet software for a convenient, all-in-one package. In presentation graphics, the newcomers to watch are enhancement software and software that offers predrawn graphics for you to use as building blocks

in creating presentations that look tailormade for your audience.

Charts and Graphs

Business graphics software allows you quickly and easily to visualize numerical information (such as sales figures) and really get an overall view of what is happening in the organization. Plotting your sales figures by hand would probably take hours. But the computer will generate a neat, accurate graph instantly from stored data. You can then spend your time on more-important matters such as spotting problem areas and planning new strategies.

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If you want to succeed with business graphics. vou should bolster vour "visual IQ."

monthly sales figures for your two top products, you would have to enter 24 numbers. Graphing these monthly sales figures broken down by five regional marketing areas would require you to type in 120 numbers. Fortunately, most graphics packages make data entry easy by allowing you to transfer data directly from the spreadsheets or databases where it is stored.

When buying chart and graph software, look for a package that allows the direct transferal of data from spreadsheets or databases, offers a range of chart types to choose from, has easy-to-follow menu options with on-line prompts, and includes an "intelligent layout" feature that makes design decisions in laving out charts.

The intelligent layout feature may be the best thing for learning about the effective design of charts and graphs. You can observe the layout decisions the program makes and then override them once you

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are ready to select for yourself.

Many integrated software packages now include a graphics option as part of the spreadsheet, and although PC chose not to include them as part of this software

roundup, they have a distinct advantagereferring data to be graphed is a breeze. Another plus for integrated graphics is that you can often combine the graphics more easily with text and data. But typically, in-

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T. shirts Top quality cotton. To order, call today. tegrated graphics modules sport fewer features than standalone programs, omitting such goodies as variable typeface and type size, a wide variety of chart types, special effects, and numerous options for fill patterns and line styles. On the other hand, you are more likely actually to use the graphics in an integrated program just because they're there.

Drawing and Painting

Graphs such as bar and line charts can be boring without pictures to add drama and interest. Painting and drawing software allows you to spruce up charts and graphs on the electronic drawing board. This type of software transforms the computer into the ultimate artist's canvas, yet you don't have to be an artist to use it. You can draw, redraw, and polish images with minimal effort, just as with word processing software, you can write, rewrite, and polish text. You use a graphics input de-

> Painting and drawing software allows you to spruce up charts and graphs on the electronic drawing board

vice or arrow keys to sketch an image on the drawing board, then press various function keys that automatically scale it up or down, rotate or invert it, combine it with geometric shapes, color it, texturize it. or zoom in for a close up. You can even create a mirror image, "rubber stamp" copies of the image elsewhere on the screen, and animate it, all in a matter of minutes. The best feature of all for many may be the electronic eraser. It lets you undo any mistakes without a trace.

Before you buy a drawing and painting software package, check to see if it accepts input from a joystick, mouse, or touch tablet; provides on-line help if you forget commands; allows freehand sketching; has easy-to-use commands for creating and positioning objects; and lets you perform

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- A new utility to compress sequences of identical characters from an executable file and to optimize the relocation table. EXEMOD Utility A new utility used to modify the fields in the header according to
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 "C" Benchmarks—done on a Compaq Plus with 512k memory with no 8087. Program "SIEVE" with register variables.

 Exec Time Code Size EXE Size

Microsoft C 9.39 141 5.914 Lattice C :12.24 164 20.072

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^{*}Purchase both Microsoft C Compiler and Microsoft Macro Assemble and get a \$25 rebute direct from Microsoft. See package for details.

special effects such as animation, rotation, and sizing.

Try to create a circle, and you will quickly find out how easy the software is to use. With some packages, you indicate the

center and then press the arrow keys until the circle displayed on the screen has grown to the desired size. Other packages require you to visualize where the circle will appear as you specify only the center of the circle and one point on its circumference. The real challenge comes with software that makes you specify the box that would enclose the circle with the circle touching the midpoint of each side. A perfect square will produce a circle while rectangles produce ellipses. If you think this process may be slightly confusing, you're right. It takes some practice to create and position circles just where you want them.

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For those who simply refuse to draw, there is electronic clip-art. You "cut out" professionally drawn images and "paste"

> The advantage of using electronic clip-art is that vou can easily dress up your more abstract graphs with pictures.

them onto your own images for a customized look. Several software nackages let you select from a large collection of predrawn images relating to a variety of subjects. The advantage of using electronic clip-art is that you can easily dress up your more abstract graphs of numerical data with pictures. This can add a refreshing and creative touch to statistical graphs. In selecting electronic clip-art, look for a package that includes printed copies of all images for easier selection, allows you to choose new color combinations for the images, lets you use parts of full-screen images, and makes customizing easy to avoid a prefabricated look.

You may think that many topics are too abstract or complex for visual representation and that in these cases electronic clipart would prove largely useless. Data tables and "word slides" may seem a more practical alternative. Actually, however, most topics can be depicted at least indirectly. For example, you can portray an abstract tonic by showing something concrete associated with it, such as an hourglass to represent the idea of time.

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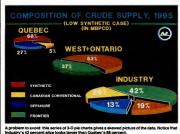
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3:30



After you create your electronic graphics, you'll need a way to show them to others if your goal is to give a presentation. Yet creating 35mm slides, transparencies, or prints of your screen graphics requires extra time and money. And sometimes what you see on the monitor screen is not what you get in the reproductions. One solution is to show your "slides" right from the computer's screen. For small meetings, screen shows are replacing traditional slide shows because they eliminate the extra, often costly step of creating color slides and transparencies from the computer image. Slide show software allows you to display your screen images in any order you choose.

Look for a package that allows both manual and automatic advance of screen images, uses "special effects" transitions (curtains, dissolves, wipes), allows variable time between images when automatic advance is used, and can hold a large num-

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ber of "slides" on one diskette. With large-screen projection equipment, you can even use screen shows for presentations to large groups. As computer equipment becomes as readily available as slide projectors, you can begin carrying a diskette instead of a slide tray to your presenta-

Enhancement and Output Software

PC sereen graphics have characteristic ragged edges called "haggies." When filmed and projected onto a large screen for a presentation, these ragged edges loom as "giant jagges," not an impress wagst for your audience. Using enhancement software and the associated imaging service, you anger and of the ragged edges in sides and transparenties made may be a support of the project of the project



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row using 256K chips added to a enhanced AT will give you fe40K user memory and 384K above the 1 MEG boundary. The memory above MEG can be used by DOS 3.X for VDISK, a virtual ram disk. We think that a 512K board (a first row of 256K chips) is your best buy.

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ages, and it will return picture-perfect slides with a 4,000- by 4,000-line resolu-

Enhancement software generally costs several hundred dollars, and you pay a

small fee each time you use the service. Still, it's a much cheaper way to go than buying hardware to produce slides of comparable quality. The only catch is that these services generally are limited to the

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standard chart options and word slides. Freehand graphics, such as those created by paint and draw programs, are not candidates for this type of service because of the way the visual information is coded. Enhancement software can only smooth out graphics that were originally stored as recognizable geometric shapes such as circles, boxes, and line segments. Most graphics packages store full-screen images as a collection of dots. Our brains organize those dots into shapes and meaningful patterns as we view them, but the enhancement software can't tell a curve from a straight line, so it doesn't know which dots to act upon. For a fee, some enhancement services will use sophisticated graphics workstations to make slides of your freehand graphics.



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frames, can use. As graphics software is standardized, PC graphics will become increasingly more portable.

Selecting a Graphics Package

If you plan to use graphics software to make presentations, then you probably need a package that includes drawing eaability, clip-art, and a slide show option, as well as the standard charts and graphs. But if your goal is to visualize your numerical data to understand it better before making decisions, then it is important to select a package that can easily tup into

> Many of the jazzier packages include only the standard formatsbar, line, and pie charts.

your database and present the information in a visual format. What type of charts and graphs do you need? Many of the jazzier presentation packages include only the standard formats-bar, line, and pie charts. And even those formats may have limited options. For example, many packages will not show negative values in a bar chart (that is, descending as well as ascending bars). Many don't include statistical capabilities such as fitting a regression line to a set of points. Perhaps you need balance sheets or PERT, Gantt, or organizational charts-all types not found in the typical business graphics package. Check out the capabilities of the package before

Do you really need drawing and clip-art capabilities? If many of your presentation "visuals" are actually words—headings, terms, and main categories—mest of your presentation graphics may end up being words bides. In this case, you should select a graphics package that has a variety of typefaces and type sizes. You'll be able to take advantage of the graphics enhancement services for crisp, easy-to-read sides. But remember that to get the maxithe CopyCover (Patents Pending)
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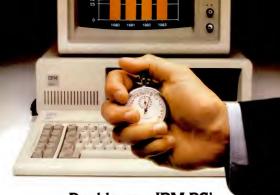


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mum benefit of graphics and really catch people's interest, you need pictures.

What about the data-handling capabilities of graphics software? Many presentation graphics packages have very limited data capabilities. Others are limited only by the amount of memory available on your system. If you have a large database, you need a package that can handle large amounts of data and transfer data directly from your database or spreadober files.

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If you have a limited budget, should your money go toward high-resolution graphics or full-color graphics? If you want to make a strong impact on your audience with presentation graphics, you should probably opt for packages with color palette options and multicolored clip-art. People like to see color, and it has a strong effect on us whether we realize it or not. The warmer colors (red and orange) excite us while the cooler colors (blue and green) are more soothing. The brighter, warmer colors will draw a viewer's attention first. Most packages that allow you to create graphics in color also allow you to change the colors until you achieve the desired effect. But if you need precision graphics that show every detail, then look for a

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package that you can connect to an enhancement service. High-resolution graphics may be more appropriate for information that is technical or specific and for audiences that think analytically.

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> If you will be using a graphics package frequently and extensively, you may prefer a command-driven

package. command-driven package. Although it takes longer to learn and remember all of the commands, command-driven packages offer speed and flexibility once you become familiar with them. However, if you will use the graphics package infrequently and along with a variety of other applications packages, then a menu-driven package is worth consideration. Sometimes it feels like being spoon-fed to be prompted for every detail when creating a chart, and cycling through menu options can be cumbersome. But it beats wading through the manual for 10 minutes to find a particular command.

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PC MAGAZINE . JUNE 11, 1985

PROGRAMMING . STEVE HOLZNER

Watching for Disk Frrors

DOS lets many disk errors pass unobserved. Here's how to spot them.

aybe I'm paranoid, but I have to confess that disks worry me. Disk drives contain the most moving parts in the PC, and they have to maintain the most delicate mechanical alignment. Gradual deterioration in performance is inevitable, both from casual head contamination and, ultimately, wear. And while catastrophic crashes or motor freezeups are rare, chances are that even these will be presaged by some signs of impending trouble.

DOS, of course, knows just how hard it is to reliably read and write bit streams on an imperfect, moving magnetic surface. Indeed, DOS retries each disk read five times before it turns things over to its critical error handler and reports its failure with the unsettling "Abort, Retry or Ignore?" message. What DOS doesn't tell you, however, is that it is having trouble. Instead, it covers up the errors until they become serious enough to cause failure. In the case of dirty disk heads, for example, intermittent errors may begin to occur long before DOS reports them to you. While you can use the verify option to make sure that the file you wrote is readable at the time, head contamination may be making the transcription spotty and subsequently unreliable.

Exposing the Coverup To correct this situation I've written a

short utility called DSKWATCH.COM. The .ASM code for the program is shown in Figure 1. Just in case you don't happen to have IBM's Macro Assembler (shame! shame!), you can key in the BASIC listing (Figure 2), and when you run the program, 1985/No. 12



DSKWATCH.COM will be created for you, automatically. [The program, in ASM, .BAS, and .COM forms, is also available for free downloading via modem from PC's Interactive Reader Service (212) 696-0360 -- Ed.1

DSKWATCH.COM's job is simply to report all the intermittent errors DOS encounters during its disk operations, usually before they grow serious enough to halt your programs. These intermittent problems can be a sign of incipient failure. DSKWATCH simply puts a disk error message in the upper right-hand corner of the screen to alert you, at the minor crisis level, about dirty heads, an unreliable disk controller, or the like. DSKWATCH itself does not interfere with any program you have running: DOS alone continues to decide (following its 5-try rule) that a problem is so intractable that it simply can't go

PROGRAMMING

on—as it does, for example, if you attempt to write on a write-protected disk. Since hardware errors don't usually come out of nowhere, DSKWATCH may afford you advance warning of their impending presence. When DSKWATCH is working you'll thopfully) never see it, so the natural place to put it is in your AUTOEXEC-BAT file, where it will be read in each time you boot up. The program simply attacks itself neatly to DOS, and whenever there at all.

the drives are used, DSKWATCH steps in and checks to see if there was an error before giving control back to DOS to retry the operation. If there was, DSKWATCH tells you; otherwise, you won't know it's there at all.

| INTERRU | PTS ORG | SEGMENT AT ØH | This is where the disk interrupt tholds the address of its service routine |
|--------------------|------------|------------------------|--|
| DISK_IN INTERRU | T | LABEL DWORD ENDS | , |
| SCREEN SCREEN | | АТ ӨВӨӨӨН | ;A dummy segment to use as the ;Extra Segment so we can write to the display |
| CODE_SE | | SEGMENT CS:CODE_SEG | |
| | ORG | 100H | ORG = 188H to make this into a .COM file |
| FIRST: | JMP | LOAD_WATCH | First time through jump to initialize routine |
| | MSG PAR | T 1 DB | 'Disk error: ' :Here are the error messages. |
| | MSG_PAR | | 'No response Failed Seek NEC Error |
| | | DB | 'Bad CRC SeenDMA Overrun Impos Sector' |
| | | DB | 'No Addr MarkW. ProtectedErr Unknown ' |
| | FIRST_P | OSITION DW | ? ;Position of lst char on screen |
| | FLAGS | DW | ? |
| | | SEG_OFFSET | DW 9 ;9 for mono, 8999H for graphics |
| | OLD_DIS | | DD ? ;Location of old disk interrupt |
| | RET_ADD | | LABEL DWORD ;Used in fooling around with |
| | RET_ADD | R_WORD | DW 2 DUP(?) ; stack. |
| DISK_WA | TCH | PROC FAR | The Disk interrupt will now come here. |
| _ | ASSUME | CS: CODE_SEG | |
| | PUSHF | | ;First, call old disk interrupt |
| | CALL | OLD_DISK_INT | |
| | PUSHF | | ;Save the flags in memeory location "FLAGS" |
| | POP | FLAGS | ; (cunning name). |
| | JC | ERROR | ; If there was an error, carry flag will have |
| | JMP | FIN | ; been set by Disk interrupt. |
| ERROR: | PUSH | AX | ;AH has the status of the error |
| | PUSH | CX | ;Push all used registers for politeness |
| | PUSH | DX | |
| | PUSH | DI | |
| | PUSH | SI ES | |
| | LEA | SI.MSG PART 1 | :Always print "Disk Error: " part. |
| | ASSUME | | :Use screen as extra segment |
| | MOV | DX, SCREEN | 'ose screen as extra sedment |
| | MOV | ES.DX | |
| | MOV | DI, SCREEN_SEG | OFFSET :DI will be pointer to screen postion |
| | ADD | DI.FIRST POSI | |
| | CALL | WRITE_TO_SCRE | |
| | MOV | DH,80H | :Initialize for later comparisons |
| | MOV | CX,7 | :Loop seven times |
| E LOOP: | CMP | AH DH | Are error code and DH the same? |
| | JE | E FOUND | ; If yes, Error has been found |
| | | | |

Figure 1: The assembly language source code for DSKWATCH.COM

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|---|--------|--------|------|---------|
| mpre and fair to acc. | 9" | K / | - | 35 |
| COMPILATION SPEED | 12 | K // | 12 K | NO |
| EXECUTION SPEED | | | YES | 1 |
| CODE SIZE | YES | Y | s // | NO |
| BUILT-IN INTERACTIVE EDITOR | YES | | | 300K- |
| ONE STEP COMPILE | 39K | 35H | | NO |
| COMPILER SIZE | | NO | | YES |
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mark run on an IEM PC using MS Pascal version 3.2 and the DOS linker version 2.6. The 179 line program used is the "Gauss Seider" program out of Alan R. Miller's book. Pascal programs for scientists and engineers (Syber, page 128) with a 3 dimensional

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```
ADD
                SI,12
                                          Point to next error message
        SHR
                DH.1
                                          Divide DH by 2
        LOOP
                 E_LOOP
                                          ; Keep going until matched .
                                                                        DH=0
        CMP
                AH.3
                                          ;Error Code not even number; 3 perhaps?
                 E FOUND
        JE
                                          ; If yes, have found the error
                ST.12
        ADD
                                          ¿Err unknown; unknown error returned
E_FOUND: CALL
                WRITE_TO_SCREEN
                                          ;Write the error message to screen
        POP
                ES
                         ; Having done Pushes, here are the Pops
        POP
        POP
                DX
        POP
                CX
        POP
                AX
                RET ADDR WORD
                                          ;Fooling with the stack. We want to
PIN:
                RET_ADDR_WORD[2]
                                          ;preserve the flags but the old flags
                SP,2
        ADD
                                          are still on the stack. First remove
        PUSH
                FLAGS
                                          ; return address, then flags. Fill flags
                                          ;from "FLAGS", return to correct addr.
                RET_ADDR
        JMP
DISK WATCH
                ENDP
WRITE_TO_SCREEN PROC
                         NEAR
                                 ; Puts 12 characters on the screen
                                 :Loop 12 times
        MOV
                CX,12
W LOOP: MOVS
                ES:BYTE PTR[DI], CS: [SI] ; Move to the screen
        MOV
                AL,7
                                 ¡Move screen attribute into screen buffer
        MOV
                ES:[DI],AL
        INC
                DI
                                 ;Point to next byte in screen buffer
        LOOP
                W_LOOP
                                 ; Keep going until done.
        RET
                                 Exeunt
WRITE_TO_SCREEN ENDP
LOAD WATCH
                   PROC
                           MEAR
                                 ;This procedure intializes everything
        ASSUME
                DS: INTERRUPTS
                                 The data segment will be the Interrupt area
        MOV
                AX, INTERRUPTS
        MOV
                DS.AX
        MOV
                AX, DISK_INT
                                      :Get the old interrupt service routine
        MOV
                OLD DISK INT.AX
                                     ;address and put it into our location
        MOV
                AX.DISK INT[2]
                                      ;OLD_DISK_INT so we can call it.
        MOV
                OLD_DISK_INT[2],AX
        MOV
                DISK INT.OFFSET DISK WATCH : Now load the address of Dakwatch
        MOV
                DISK_INT[2],CS
                                         ;routine into the Disk interrupt
        MOV
                AH, 15
                                          :Ask for service 15 of INT 10H
        INT
                10H
                                          This tells us how display is set up
        SUB
                AH, 25
                                          Move to twenty five places before edge
        SHL
                AH.1
                                          ;Mult by two (char & attribute bytes)
        MOV
                BYTE PTR FIRST_POSITION, AH
                                                  :Set screen cursor
        TEST
                AL.4
                                          :Is it a monochrome display?
        JNZ
                EXIT
                                          ;Yes - jump out
                SCREEN_SEG_OFFSET,8888H ; No - set up for graphics display
        MOV
EXIT:
        MOV
                DX.OFFSET LOAD WATCH
                                          ;Set up everything but this program to
        INT
                27 H
                                          stay and attach itself to DOS
LOAD WATCH
                  ENDP
        CODE SEC
                         ENDS
                FIRST
                         :END "FIRST" so 8088 will go to FIRST first.
        END
                                                                            (Figure I ess
```

26

Borland's SideKick Software Product of the Year*

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PROGRAMMING

On Understanding Errors

To understand the errors that might show up, let's take a short tour through the PC's disk drive system, pausing at the high points. The drives constitute an entire subsystem, which is controlled by an NEC μPD765 FDC. Decoded, this means, Nippon Electric Corporation microprocessor Floppy Disk Controller, a chip usually referred to in IBM literature simply as "the Nec." The Nec has as many pins (40) as does an 8088 microprocessor, the heart of the PC, and it is nearly as complex. It is one of the few parts of the PC allowed read/write Direct Memory Access (DMA). Two other chips with Direct Memory Access are the 8088 itself (so something can get done) and the display screen controller (so we know about it).

What this means is that while your PC is doing something else, the Nec, independently, can read data from a diskette and slip it into memory for the PC to use when it's ready. It is the Nec that sends back the error codes that DSKWATCH ultimately decodes and announces.

The PC sets things up for the Nec by sending it a table of values for smooth operation. This table includes such items as the amount of time to give the disk head to settle after it has shot into place over the diskette surface or, once settled, to engage the disk. Since IBM's drives often seem. slow to the point of insouciance, some naive people (including myself) have thought that the times in the table could be shortened, making the drives move at a brisker clip. Regrettably, all you'll get for that effort are disk errors, since the times are already set as fast as is prudent. My attempts led me to the conclusion that the only time in the table that can be changed with impunity is the shut-off time of the drive motors, so they won't keep spinning for a half second or more after everything is done. A

minor triumph, indeed.

The table sent to the Nec is as important to the PC's operation as it is hidden from view. While most people will never see the disk table—and not consider themselves deprived—it is right here that the major change from DOS 1.1 to 2.0 was made: the switch from eight sectors on each disk track to nine.

Each side of a diskette is divided into 40 concentric tracks, with rack 00 on the out-side. The active width of each track is about .03 millimeters, or about 39 percent of the thickness of a dime. Actually, flog-po diskettes can carry much more than they do now; their track density can easily be doubled, 10 30, without strain; [Media be doubled, 10 30, without strain; [Media track is subdivided into either 8 or 9 percent, 100 S. 1, see 1 and 10 S. 2 percent, 100 S. 1, see 1 S. 2 percent, 100 S. 1, see 1 S. 2 percent, 100 S. 1, see 1 S. 2 percent, 100 S. 2, and 3, ou se, 9 which is why you can't read diskettes formatted under the that of percent seeds of the se

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der the former.

If you want to indulge in copy protection, you can remodel the disk table. Copy protection is most commonly done by changing the number of bytes in a sector. Each sector on the disk is like a little magnetic island, with its own ID field and data field and even address marks that form part of a disk map the Nec uses to know where the head is. (Missing address marks are one possible error DSKWATCH checks for, as we'll see.) When DOS reads from the disk and doesn't find the number of bytes in a sector that it expects, it reports an error unless your program has changed the disk table. Many copy-protected programs work just this way-as, of course, do programs that copy copy-protected disks.

Additional Checks

After the Nec is instructed to read in a sector, the disk head has settled over the track and is engaged, the address marks and ID fields are found to be correct, and the data is read into memory, how do we know that what has been read is correct? There are two common ways to check what came in with what should have: the checksum and the Cyclic Redundancy Check (CRC) methods. These are important because the most common error caused by dirty disk drive heads happens right here, when data is misread.

A checksum is as simple as it sounds. As each byte is written, its value is added to a running sum, the checksum byte. A single byte can hold any number from 0 to 255, or IIIIIII, in binary. When the result of the addition exceeds 255, the part greater than 255 can be (and is) ignored, since the remaining bits continue to change. The resultant byte is written, with the data, so it can be confirmed when everything is read back in. When the data is read, the same running sum is taken and the new checksum is matched against the old one. If they match, well and good; if not, an error is

presumed. The Cyclic Redundancy Check is similar, except that it uses a polynomial $(x^{16}+x^{12}+x^5+1)$ is commonly used in the PC), and as bytes are written, they are passed through the polynomial, and the total sum is stored along with the data. During a read, the same sum is taken, and the two answers are compared. The PC's disk operations are checked with Cyclic Redundancy Checks for all the data that is written, since this test catches patterned errors that could repeat using a simple checksum. If the CRC generated while writing doesn't match the one generated while reading. DOS tries to read in the data again, giving the Nec up to five tries to supply it with the same answer. If the head is dirty enough to cause intermittent errors, you might never hear about it from DOS, but you will from DSKWATCH.

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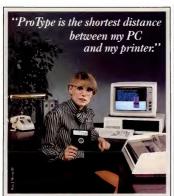


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PROGRAMMING

limited to 12 characters) messages in the upper right-hand corner of the screen. There are nine possible disk errors that DSKWATCH will report, as follows:

No Response. This means that no signals were received from the disk drive. The most common reason for this message is that there was no disk in the drive. Try it and see for yourself—this is a good test of your copy of DSKWATCH, though this is obviously a critical error that DOS itself will renort.

Failed Seek. This means that something drive heads. If you see this error while forinterfered with the operation of locating matting a disk, it means that the test natern

data on the disk, or that finding the correct track failed.

NEC Error. If this message appears, the PC has received inconsistent data from the Nec, which is cause indeed for worry. Statistically, in fact, the Nec is very reliable. If you see this error in a machine, though, it means that that particular Nec isn'tso reliable any more.

Bad CRC Seen. In other words, the file didn't make the trip without a blemish. On a formatted disk this can mean dirty disk drive heads. If you see this error while for-

read out to disk came back with errors, and the PC is about to mark that sector as bad.

DMA Overrun. This is an unusual error. It means that the PC was so busy it denied the Nee access to the data bus and thus
to the memory. (Everything that goes into
memory has to get there on the data bus,
and the 8088 either grants or denies access
to it.) Doubtless, by the time DOS tries
again, there will probably be access avail-

Impos Sector. In this case the Nec was directed to read or write a sector that simply doesn't exist, and there is nothing it

able.

```
10
      DIM E$(10):E$(1)="Disk Error: "
 20
      REM Make sure each of the following messages has 12 characters total.
 30
      E$(2)="No Response ":E$(3)="Failed Seek ":E$(4)="NEC Error
 48
      E$(5)="Bad CRC Seen":E$(6)="DMA Overrun ":E$(7)="Impos Sector"
E$(8)="No Addr Mark":E$(9)="W. Protected":E$(18)="Etr Unknown"
 50
      OPEN "DSKWATCH.COM" AS # 1 LEN = 1
 60
                                                       'Open Dskwatch.com
 78
      PRINT "CREATING DSKWATCH, COM"
 80
      FIELD #1,1 AS BYTE.$
                                                       'Specify what goes into it
      FOR N = 1 TO 193
                                                       '193 bytes
 98
188
      READ BYTE. %
110
      IF BYTE.% <> -1 GOTO 150
120
      FOR I = 1 TO 10: FOR J = 1 TO 12
130
      LSET BYTE.$ = MID$(E$(I),J,1):PUT #1
140
      NEXT J:NEXT I:GOTO 178
150
      LSET BYTE.$ = CHR$(BYTE.%)
                                                      'Load byte into buffer
166
      PUT #1
                                                      'Write buffer out
170
      NEXT N
     CLOSE #1
PRINT "DSKWATCH.COM CREATED."
180
                                                      'Close file 'And you're done.
190
200
218
      DATA
             233,
                    251.
228
      DATA
               0,
                       ø,
                              0,
                                     ø,
                                            0,
                                                                  8,
                                                                        156,
                                                                                46
                                                    0,
                                                           ø,
230
      DATA
                           129,
                                                                  6,
                      30.
                                     1,
                                          156,
                                                   46,
                                                         143,
                                                                       125,
240
      DATA
             114.
                       3,
                            235,
                                    63,
                                          144,
                                                   80,
                                                          81,
                                                                 82,
                                                                         87,
                                                                                86
      DATA
250
                                    54,
                                            з,
                                                                   ø,
                      46,
                            141,
                                                    1,
                                                         186,
                                                                        176,
                                                                               142
268
                                          127,
                                                    1,
      DATA
             194,
                      46,
                            139,
                                    62.
                                                          46.
                                                                   3.
                                                                         62.
                                     0,
278
      DATA
               1,
                    232.
                             57,
                                          182,
                                                 128,
                                                         185,
                                                                   7,
                                                                          ø,
                                                                                58
             230,
280
      DATA
                    116,
                                   131,
                                                                       226,
                             15,
                                          198,
                                                   12,
                                                         208,
                                                                238,
                                                                               245
290
      DATA
             128,
                    252,
                              3,
                                   116,
                                            З,
                                                 131.
                                                         198,
                                                                 12,
                                                                        232.
                                                                                38
300
      DATA
                ø.
                       7,
                             94,
                                    95,
                                           90,
                                                                 46,
                                                                        143.
                                                   89,
                                                          88,
310
      DATA
             133,
                             46,
                                   143,
                                            6,
                                                 135,
                                                           1,
                                                                131,
                       1,
                                                                        196,
320
                    255,
                                            i,
                                                          46
                                                                255,
      DATA
              46,
                             54,
                                   125,
                                                  157.
                             12,
                                                                         38,
330
      DATA
                ı.
                    185.
                                            46,
                                                  164.
                                                         176.
                                                                   7,
                                                                               136
      DATA
340
                5,
                      71,
                            226,
                                   246,
                                          195,
                                                  184,
                                                           ø,
                                                                   ø,
                                                                        142,
                                                                               216
358
      DATA
             161,
                      76,
                              ø,
                                    46,
                                           163,
                                                  129,
                                                           1,
                                                                161,
                                                                         78,
368
      DATA
              46,
                    163,
                            131,
                                          199,
                                                    6.
                                                          76.
                                                                   ø,
                                                                        137,
370
      DATA
             140.
                      14.
                             78.
                                          180,
                                                   15,
                                                         205.
                                                                 16,
                                                                        128,
                                                                               236
                                     ø.
388
      DATA
              25,
                    208,
                            228,
                                    46,
                                                   38,
                                                         123,
                                                                   1,
                                           136,
                                                                        168,
398
             117,
                             46,
                                   199,
                                                                               186
      DATA
                       7,
                                             6,
                                                 127,
                                                           1,
                                                                   ø,
                                                                        128,
488
      DATA
             254.
                       1,
                            205.
                                    39
```

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can do but return an error. This is a software problem and therefore more readily amended

No Addr Mork. Here, the Nec has lost its place, since an address mark, its signpost on the disk, was missing. More often than not, the error is on the disk. If you try to read from an unformatted blank disk, for example, this is the error you will get. IThe No Addr Mork error can also orise when a disk formatted on one PC is used on another whose tracks do not entirely coincide.-

W. Protected. This message, perhaps with more brevity than may be prudent, indicates that an attempt was made to write to a write-protected disk. DOS will inform you about what's happening in any case, so DSKWATCH's report is going to be redundant

Err Unknown. More cause for worry. This message means that something went wrong, but not even the Nec knows what. While waiting for this error to clear up, you might start looking for your service contract.

In Sum

Fd 1

Since DSKWATCH reports intermittent errors before DOS thinks they are serious, don't over-react at the very first indication of possible trouble. What this program does is give you advance notice that a head is getting dirty or a track may be drifting out of alignment in time to forestall hardware failures, some of which might turn into expensive misadventures. This is not to suggest that you should expect disk problems. The PC's disk drives are, after all, very reliable mechanisms whose glass or ceramic head faces are designed for many thousands of hours of floppy polishing. Loose oxide particles are inevitable. however, and could redeposit themselves elsewhere on the floppy surface (causing data errors) or on the head faces, where they can "score" the disks as they turn. Fortunately, diskettes themselves are to some extent self-cleaning: the liner of each diskette is designed to polish and clean it with every revolution.

So, the best news you'll ever hear from DSKWATCH is none at all. Still, when you hear odd noises from your disk drives late at night, it just can't hurt to find out what's going on

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User-to-User

PC readers use this forum to help one another by passing along their questions, solutions, comments, and complaints.

Reverse Image

While using the graphics utility included with DOS 2.1, I discovered that the printout did not accurately match the image on my screen. The discrepancy was obvious: the printed copy transposed the foreground



and background colors. This transposition is fine for text but can make it difficult to see details in a graphics printout. To solve this problem I wrote a small BASIC subroutine (see Figure 1).

It takes 2 minutes and 35 seconds to reverse the colors in interpreted BASIC. When compiled, it takes between 3 and 18 seconds—depending on the program in which it is being used. It works equally well in 40 and 80 column color graphics

The subroutine reads each byte in the screen buffer, subracts its value from 255, and then rewrites the new value to the buffer in place of the old. It uses 255 to convert the image because of the way the screen information is stored in memory. Each byte

stores the display information for four pixels in binary format. There are four possible to values for each pixel (00, 01, 10, or 11) that determine which of the four possible colors appears on the screen. Each byte, two of the colors appears on the screen. Each byte, two of the colors appears on the screen. Each byte, two of the colors appears of the screen color, the value for each pel needs to be converted to its reciprocal—00 needs to be changed to 11,01 to 10, 10to 01, and 11 to 0.5 to reverse the color of each pel, you need to subtract the original number from 255.

Jack Grasham Portland, Oregon

What you're really doing here is XORing each byte. We used the heart of your trick to create the REVDEMO.BAS demo program in Figure 2. REVDEMO draws 100 mostly filled circles. Then you can hit F1 to change the background color and F2 to change the palette. Hitting F9 sends the program to a revised version of Mr. Grasham's subroutine; this one is faster, and we've changed most of the hex numbers to their decimal equivalents, Hitting F10 quits. Since the program works by XORing, hitting F9 twice in succession brings the image back to its original colors. This program runs like lightning when compiled.

Custom Cursor

When I write a program, I like to include small, simple tricks to keep the user's attention. The CURSOR.BAS program in Figure 3 overlaps the normal cursor with a customized one.

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The program finds the proper cursor location by using POS() and CSRLIN; it then overlays the new cursor on the old. Russell Brooks

This trick is indeed an attention getter. We added the animated XOR bouncing feature at the end; why not, as long as you are PUTting and GETting the new cursor im-Sparta, New Jersey age anyway?

```
ON KEY (9) GOSUB 50000: KEY (9) ON
49999 GOTO 49999
58888 *** Scr
         *** Screen reverse subroutine ***
58818 DEF SEG-4HB888
56626 POR I-486 TO 481F3F
50030
        X=PEEK(I):Y=255-X:POKE I,Y
50040
        J=I+6H2000:X=PERK(J):Y=255-X:POKE J.Y
50050 NEXT I
50060 RETURN
```

Flaure 1: Subroutine to reverse the colors of a grophics screen (SCREEN 1 or SCREEN 2).

```
100 ' REVDEMO.BAS using Jack Grasham's routine
110 DEFINT A-Z:SCREEN 1,0:COLOR 0,2:KEY OPP:CLS
128 ON KEY(1) GOSUB 218: KEY(1) ON
                                                     'F1 = background
13# ON KEY(2) GOSUB 22#: KEY(2) ON
                                                     'F2 = palette
148 ON KEY (9) GOSUB 248: KEY (9) ON
                                                     'F9 = reverse
158 ON KEY(18) GOSUB 238: KEY(18) ON 168 FOR C=1 TO 188
                                                     'Fle = quit
178 P=RND*319:Q=RND*199:R=RND*28:S=(C MOD 3)+1
188 CIRCLE (P,Q),R,S:PAINT (P,Q),8,S
198 NEXT
200 GOTO 200
218 K=(K+1) MOD 16:COLOR K,J:RETURN
228 J=(J+1) MOD 2:COLOR K,J:RETURN
236 END
248 DEF SEG-&HB888
258 FOR I=8 TO 7999
```

268 POKE I, PEEK(I) XOR 255: POKE I+8192, PEEK(I+8192) XOR 255

Figure 2: Demo program to reverse screen colors.

270 NEXT: RETURN

```
188 ' CURSOR.BAS -- Russ Brooks
 118 DIM CURSOR (28) : SCREEN 1,8: KEY OFF : CLS
118 DIM CHESCR (28):SCREEN 1,8:REV OFF:CLS
128 DRAM "MH 1,404RF2[LG]:MAP 7,6G[LE]HUZE]RIP!"
138 GRT (8,8)-(7,7), CURSOR:PRINT "Now type: ";
148 PUT (1905(6)-1)-8; (SERLIH-1)-8), CURSOR:16-1)-8, AS-INER'S:IF AS-" THEN 159
159 AS-INER'S:IF AS-" THEN 159
168 IT AS-CURSOR:[3]) THEN PRINT AS:IFS-FS-AS:GOTO 148
176 PRINT:PRINT:PRINT "You typed: ";FS:C-CSRLIN-8
168 FOR A-1 TO 312
```

198 PUT (A,C), CURSOR, XOR: PUT (A,C), CURSOR, XOR: NEXT 288 C=CSRLIN*8:FOR A=312 TO 1 STEP -1 218 PUT (A,C),CURSOR,XOR:FUT (A,C),CURSOR,XOR:NEXT 228 IF INKEYS=" THEN 188

Figure 3: CURSOR BAS program to customize the normal cursor in graphics mode (for color monitors only).

```
100 SCREEN 2:OUT 985,2:CLS
110 LOCATE 5,30:PRINT "This is small type"
120 DEF SEG=0:POKE 1097,4:POKE 1098,40:DEF SEG
130 LOCATE 7,12:PRINT "This is large type
```

140 DEF SEG=0:POKE 1097,6:POKE 1098,80:DEF SEG 150 LOCATE 9,30:PRINT "And back to small type"

Figure 4: Program to put two sizes of text on the same graphics screen.



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Text Mixing

BASIC's graphics screens limit you to using wide text characters in 40-column mode and narrow ones in 80-column mode. However, there is a simple way to confuse BASIC and use both sizes in 80column graphics mode.

To get wide characters in SCREEN 2, type:

SCREEN 2 DEF SEG-Ø POKE 10 97.4 POKE 10 98.40 DEF SEC

Any PRINT statements used after this will display wide characters. However, there are some cautions with this trick. First, text written past the 40th column will wrap to the previous line, so don't print past the right margin. Second, when returning control to BASIC with a STOP or END command, make sure you use the

echo off echo THIS IS LEVELL. BAT basica beep

command /c level2 echo Returned to LEVELL.BAT echo off

echo THIS IS LEVEL2. BAT basica beep command /c level3

echo Returned to LEVEL2.BAT

echo off echo THIS IS LEVEL4.BAT basica beep

echo off

basica beep

command /c level4

10 BEEP 'BEEP, BAS PROGRAM 28 FOR DELAY=1 to 188:NEXT 38 SYSTEM

echo Returned to LEVEL3.BAT

echo THIS IS LEVEL3.BAT

Figure 5: Four simple files to demoustrate batch file nesting using COMMAND/C to pass control. To use this properly, be sure to create the BEEP BAS program above and have it and RASICA COM on your disk.

tree /f | find "Path" | more

chkdsk /v | find "Directory" | sort | more

Figure 6: Two ways to list subdirectories. Make sure proper combinations of TRFF COM. FIND.EXE, CHKDSK.COM, MORE.COM, and SORT.EXE are on your disk or PATHed to,

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USER-TO-USER

correct settings for 80-column text before editing. To restore the settings, type:

DEF SEG-6 POKE 10 97,6 POKE 10 98.80 DEF SEG

Finally, don't mix 40-width text with LINE INPUT or INPUT statements. The editing keys such as the backspace will have a problem understanding where the proper cursor position is, which can lead to unpredictable results.

The program in Figure 4 uses the above trick to put both widths on the same screen. When using SCREEN 1, the opposite

sequence will produce small type, but the results are multicolored and not well suited for easy reading.

Edward Haar Houston, Texas

This terrific tip can really help in making eraphics displays distinctive. A good use would be in labeling bar or pie charts.

Nested Ratch Files

Contrary to popular belief, you can nes batch files simply by nutring COM MAND/C before the name of the batch file to be called. When each file completes execution, control returns to the calling batch file. This feature is sort of documented in the DOS manual under "Invoking a Sec ondary Command Processor" but the manual doesn't really tell how to use it this way.

Most people think performance de grades when in the secondary command processor, but my tests indicate that it doesn't. To see how this works, create the four batch files LEVELI.BAT, LEVEL 2.BAT, LEVEL3.BAT, and LEVEL 4.BAT in Figure 5. To run it, type LEV EL1. Once all the batch files have finished running you'll see a list of echoed "Return messages onscreen that show how the files were nested.

In an unrelated subject, I was amazed at the lengths some readers went to to accom plish something DOS does already-print ing a list of subdirectories. Just type:

DIR FIND " <DIR>" Rob Levittan

Halesite, New York

Mr. Levittan's original batch files each called a program he wrote called LOOP: we substituted a small BASICA program called BEEP.BAS in the accompanying examples instead of the LOOP program. and it works just fine. Rather than the BA-SICA BEEP program and batch file line. you could substitute a .COM or .EXE program that did something distinctive and then returned to DOS.



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USER-TO-USER

However, Mr. Levittan's trick of finding subdirectories will not work across subdirectories and won't go more than a level deep. The two ways DOS provides to list all your subdirectories are shown in Figure 6.

Better Delays

The custom programming I've been doing for the IBM PC works very nicely on the PC AT except for FOR . . . NEXT timing

Mr. Levittan's trick of finding subdirectories will not work across subdirectories and won't go more than a level deep. Here are two ways DOS lists all subdirectories.

loops to produce short delays. The same loop on the AT runs too fast for the desired effect. To solve the problem, I use the following routine:

10 X=TIMER+3.5 20 WHILE TIMER<X 30 WEND

(substituting the number of seconds I want to delay for the 3.5 above). This works on all PC systems and is accurate to about a tenth of a second.

> Barbara Consiglio Coral Springs, Florida

This solves one of the timing problems on the supercharged AT; the other is that it's more difficult now to synchronize music with routines that print characters on the AT's lightning quick screen.

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PC Tutor

Dialing Dilemma

Q: Many desk utility programs advertise their ability to dial telephone numbers for you directly. While I access several remote databases, the ads imply that one can use the programs to make voice calls. If the



computer is connected to a modem and a dedicated telephone line, is there something I'm missing, or is it all nonsense to talk about calling people (not computers) by modem?

Ellen Moss Poler New York, New York

A: I have evoluted at least one of those desk-dalling features. The telephone dial-er option in Sidekick will only use a mo-dom to did a telephone. If you have have a more modern and your telephone and though the same players of telephone and was the same players of telephone and your phone when the other person on sores, and both of you can talk. The advantage of this is that you can store telephone numbers by name and use of with Person duller option to pay you in toxed with Person duller option to pay you in toxed with Person Pour light their numbers.

A stundard data modem hookup (such as my own) uses a dedicated telephone line, however, and there is no way you can talk over the same line your modem is working on. There are a few modemlintegrated computer systems that use multiplexing to permit you to use a single line for both voice and data, but these are rare.

Consequently, I have been unable to find much use for the autodial feature that desk utilities provide, since my data communications package autodials. Autodiaing from Sidekick, though perhaps useful to others, seems to be a feature with no value for me.

What's the DIF?

Q: What exactly is the DIF format for storing data, and where can I get technical specifications for it? I want to transfer files to an IBM mainframe, and some of the file transfer programs say they can handle DIF format files. I want to get the technical specs so I can write my PC-created files in that format if I have to.

William Meacham Austin Texas

A: The DIF format was described some years ago in Byte magazine. Basically, the DIF format is a way of storing data in a fairly portable format. The primary specs require that: (1) Each data record ends with a car-

riage return. (2) Fields within a data record are de-

(2) Fields within a data record are delimited by commas.
(3) String fields (which may contain

commas and spaces) are enclosed within double quote murks. Thus, for example, if you have a record

type of

Parson's Name: string

Zip Coda: number Streat Addrass: string Area Code: number Telephone: number

a sample DIF record might be "John James", 10014.

"22 Maplehurst Road", 212,9159243<CR> Since DIF files are made up only of AS-



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CII charocters (letters, digits, punctuotion, and spaces), they can be easily sent to mainfromes or to other microcomputers. Auv communicatious package worth its salt will be able to send an ASCII file to a mainfrome and receive on ASCII file from o mainframe. The DIF format is rather efficient, since everything is stored in variable lengths. Although any ASCII formot you choose could be made portable to a mainframe, there are obvious advantages to adhering to a stondord.

For more detailed information on DIF files you should write to: DIF Cleoringhouse, P.O. Box 638, Newton Lower Folls, MA 02162.

Communications Complexities

would raise this figure to four.

Q: I have recently taken on a rather complex data communications task using an IBM PC-XT. Briefly, I must continuously monitor two hard-wired lines coming in over 300-baud modems and simultaneously be accessible via an additional dial-up line. As I see it, this necessitates three COM ports, and provision for a further remore terminal to be installed in the future

I purchased the XT with a Hayes 1200B internal modem (COM1), the XT's original serial port (currently COM2), and an AST Megaplus board with two RS-232 serial ports-hopefully COMs 3 and 4. The technical information supplied with the AST unit suggests that I should be able to switch a connector on the board and at least have a functional COM3. Is this correct? Is there another available interrupt which I could use for COM4?

I am buffering the hard-wired lines (which send only 80-character strings) with Practical Peripherals Microbuffers. Therefore, do I even need to have interrupt connections for COMs 3 and 4? Can more than one COM port share the same interrupt line? Is the Crosstolk program capable of addressing the buffers properly?

If I can get the proper hardware in proper configuration for COMs 3 and 4, how do I get software drivers and where do I put them? Can I copy the driver for COM1 or COM2 and change an address or two? How do I find them in DOS? Can you help? Harry M. Walker

Dickinson, Texas

A: Within the confines of a general column such as this. I con only be of help up to a point.

The PC places no inherent limitotions on the number of serial ports you can hook up. Control Systems Corp., of Minneapolis, for exomple, sells an 8-port serial board for the PC. The Software Link, of Atlonta, offers 4-port Multi-Link boards, and Alloy Computer Products in Framinghom, Massochusetts, hos PC-Slove board configurations for up to 31 ports.

By defoult, however, the IBM PC operating system is set up for no more than four serial ports (labeled COM1 through COM4). This means that programs such as MODE and COPY will only recognize four ports. Writing a device driver to enable more ports is too complex for this column, but it can be done, and I assume the people of the companies I mentioned have done so

Obviously, from your point of view it would be nice if you could use your existing hardware. As you noted, there are only two normal interrupt lines available on the PC for serial ports. The note you sent me detoils o woy to cut traces to access two other interrupt lines. On your XT, however, one of those (IRO5) is used to handle the hard disk. The other one (IRQ2) should be available with your configuration. Looking at my schematic of the IBM serial cord, it appears as if you could reuse one of the inverting buffers (U3 pins 5 and 6, which was originally designed for o nowobsolete current loop) for remapping COM3 (3E8) and COM4 (2E8). Also, remove the interrunt line connection (IRO4 or B24 on the PC bus). Then you can use the AST card for ports 2 and 3. Noturally. if you start cutting and soldering, you'll void the warranty on your serial card.

To the best of my knowledge, the AST board does not simultoneously support both COM3 and COM4. The usual reason for this is that few users need four serial ports ond, as above, there is insufficient interrupt support in any case. You can switch one port to COM3, if you can use that. Crosstalk, and most other communicotions programs, will not support modems that are not interrupt driven. Hence, those programs will not work with COM ports 3 and 4.

However, your communications task is

PC TUTOR

not impossibly demanding. Certainly none of the buffered lines needs interrupts. You might wont to investigote writing o simple program that handles the serial communications, and then since you don't need the interrupts, try changing the port address of the BBM serial card.

Checking for a Bad ROM

Q: Lightning damage necessitated replacing the CPU on my Star Microins Gemini 15x printer and the printer adapter card on my PC-2. At this point, while the Shift-PKS function works, I still can't TYPE, PRINT; or CIrl-P anything to the printer. My guess is that there may have been parial but not complete damage to the ROM BIOS printer functions; is there a way for me to check this without having to buy a replacement?

Tim Buddie Parsippany, New Jersey

A: Lightning domage can cause all sorts of stronge behovior in computers. To check whether your ROM code is unchanged, you should go to a different PC-2 and copy its ROM BIOS code onto o

floppy.

The easiest way for you to do this is with DEBUG. The ROM BIOS is located at F000:E000 and tokes up about 8K (2000hex). You should type the underlined partiants help up and then ped acch line with

ADDEBUG
-ARCHOCOE
-FCX
CX 8000
:2850
-pression in the size to 1000 hex
-pressions in the size to 1000 hex
-pressions in the some file

This creotes o file (ROMCODE) that contoins the 8K of ROM code. Now, move to your own PC ond run DEBUG ogain, this time to load and compare.

A>DEBUG ROMCODE -c188 2188 ress:Esse -g

o return.

This will print out ony differences (or simply return to the hyphen prompt if the two sets of code compare perfectly).

From the origin of your problem, I would olso suggest you check your printer coble. It is possible that a line got fused in the coble, which could olso lead to oll manner of printer onomalies.

Redirecting Files and Renaming Subdirectories

Q: In "REDirecting Your Files," (PC. Volume 4 Number 4), there was an elegant assembly language program that would enable one to redirect a file from one sufferctory into another without copying and erasing. I can do the same thing simply using BASIC's NAME ... AS ... command in the direct (nonprogramming) mode. Just enter

NAME "\dirl\file.ext"
AS "\dirl\file.ext"
I thought that perhaps the RENAME com-

mand in DOS itself might be able to do the same but have found that it will not accept a second path. Is there any patch (using DEBUG) to RENAME.COM that will enable it to do this, too?

Bob Arnett Willow Creek, California

A: You raise o very interesting point that seems to hove eluded some of the PC's most sophisticoted users and programmers. I've tested your procedure both with DOS 2.1 and 3.0, and it does exactly as you suggest, plus adding the flexibility of

changing the filtename of the some time.
Indeed, not only con you move files os
you noted, but if you have DOS 3.0 you
con even use the same procedure to a
more directories, something I know of no
woy to do within DOS to til. For exomple,
if you hove of first-level subdirectory
named IEST, you con chonge its name to
VGRAPH to retering

NAME "\TEST" AS "\GRAPH" This is quite o neot trick, indeed.

As for using the RENAME command in a similar manner, however, thot simply cannot be done. Since RENAME is an intrinsic command (in other words, not o separate progrom, but part of DOS) you would need to other COMMAND. COM to fix the problem, and I strongly odvise ogainst trying that.

The PC Tutor solves practical problems and explains points of general interest. If you'd like to see your questions answered here, drop a line to PC Tutor, PC Magazine. One Park Avenue, New York, NY 10016.

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STOP buying expensive duplicate PC peripherals Usually your peripherals just sit idle. If your office owns two or more PCs can you justify a costly printer and multiple disk drives for each PC? How often are your printers actually busy? Thirty minutes a day? An hour a day? Even your expensive hard disk is used infrequently. The obvious solution to avoid expensive

duplicate peripherals is a local area network that allows you to share printer and disk drives. But until now LANs have cost in excess of \$1,000 per PC.

INTRODUCING THE EasuLAN** OFFICE NETWORK

EasuLAN shares printers and disk drives between IBM PCs. EasyLAN can save you \$1000 or more per PC by eliminating duplicate equipment purchases.

- EasyLAN advantages: EasyLAN shares printers, disk drives,
 - and information Easy to justify-less than \$100 per PC
 - Ensy to install
 - Easy to operate
 - Easy to order
 - EasyLAN performs in the background.

EasuLAN's low price matches the small ess user's cost-sensitive budget. It is the office network solution for less than \$100 per PC including cables and software. At this price, the RISK IS LOW,

and the RENEFTTS ARE HIGH EasyLAN performs its operations concurrently in the background. EasyLAN communications, file transfers and printer operations all take place while each PC simultaneously performs such normal DOS applications as Lotus 1-2-3." WordStar" and dBASE."

EASY TO OPERATE

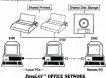
EasyLAN network software allows PC users to share printer and disk peripherals. PCs are connected by EasyLAN cables plugged directly into your PC's standard serial communication ports and EnsyLAN

EasyLAN's performance meets your small office requirements to move word processing documents and spread sheets between PCs. For example, EasyLAN can move a 10 page document between two PCs, as a background operation, in less than one minute!

EasyLAN loads automatically at boot time. It manages the PC's serial and parallel ports for

EASY SPECIFICATIONS

Each PC in the network requires an individual copy of the EusyLAN software, 128k of memory, a serial communication port(s), and DOS 2.0 or above. For your convenience, EasyLAN diskettes are not copy protected. EasyLAN runs on all IBM PC models (PC, XT, AT, and Jr) and compatible PCs.



communications and printing. All EasyLAN operations may be started from any connected PC.

Printer sharing operates transparently with existing programs. Print files are automatically written to disk and scheduled for printing. Multiple printers per PC may be designated for specific office tasks.

For example, one PC can interface with Printer 1 for general purpose output, with Printer 2 for continuous-form letterhead stationery, and with

Printer 3 for printing continuous-form invoices. Disk sharing uses Easy/AN's COPY commun EZCOPY." to move files to and from PCs. Files are stored or retrieved from disk storage and the Directory is updated. The high-capacity benefits of just one hard disk can now be shared by several PCs.

All communication operations are protected by a unique password assigned to each PC so security

EASY TO INSTALL EasyLAN can be installed in less time than it takes to

enior your coffee break. Just plug the Rasyl AN cables into existing serial ports. EasyLAN's PRINT, COPY and DIRECTORY commands are very similar to DOS commands

EASY TO ORDER EasyLAN is immediately available and easy to order. For a two PC network, start with the EasuLAN Kit. For

each additional PC in the network, order the EasyLAV Expansion Kit. The EasyLAN Kits include program diskettes, manuals and cables, which are shielded to maintain signal quality. All parts are warranteed for one year.

EasyLAN program diskettes may be purchased individually; you supply your own cables, modem links

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Studying SAT Programs

Computers can help students study for the Scholastic Aptitude Test, but all SAT preparation software is not the same. Picking the right program can be almost as tough as taking the test itself.

aking the SAT has become an American rite of passage for thousands of high school students around the country preparing for college. The test has become the foremost national standard for comparing college-bound students.

The logic of studying for an aptitude test is open to question, but SAT preparation can produce a familiarity with the examination that can reduce anxiety and improve the average student's performance. A recent study by Dr. George Hopmeier at Florida/State University suggests that computer preparation for the SAT can raise a student's score by as much as 94 points.

Over the years, two methods for SAT preparation have remained popular; textbooks that offer sample tests, study problems, and vocabulary lists; and SAT study courses, such as Stanley Kaplan's, that offer a more intense and interactive test-training environment. Now, a third method is competing for attention: computer preparation.

Essentially, computer preparation for the SAT rapidly scores and analyzes drills and multiple-choice tests, removing the more tedious aspects of studying. Computers are very good at repeatedly assigning a task and providing constant feedback.

With the popularity of home computers among teenagers, it is not surprising that thousands of families are buying SAT software. But as the number of preparation packages grows, parents and students alike should be careful to buy the software best suited to their individual needs.



A Multiple-Choice Market

Four programs on the market-Barron's COMPUTER STUDY PRO-GRAM FOR THE SAT. Computer Preparation for the SAT from Harcourt Brace Jovanovich (HBJ), Krell Software's COLLEGE BOARD SAT EXAM PREPA-RATION SERIES, and the SAT Skills Set from Sliwa Enterprises, Inc. (SEI)illustrate the range of issues in choosing SAT software

Many students find themselves befuddled by the broad scope of the SAT and discover they need assistance in organizing their work. Thus, a valuable part of any test preparation is the formulation of a cogent plan of study.

The packages from Barron's and HBJ perform extensive evaluations of a practice test to determine a reasonable course of study. Barron's program includes a step-by-step outline of how a fledgling

SAT student should proceed with the course.

The preparation package from SEL. however, offers no diagnostics. Students who have trouble recognizing where to concentrate their studies may have to turn elsewhere for aid.

Krell's software package also fails to offer a diagnostic test or direct study plan, but it does present an interesting feature called Self Customizing Logic (SCL) that automatically analyzes the student's progress to eliminate the easily answered types of questions and produce additional questions in troublesome areas. While this is a valuable feature, it may still leave students without a sense of direction, and it cannot replace a straightforward study plan.

Parallelism

Since SAT preparation should produce a familiarity with the exam, it is important to determine how closely the software package parallels the SAT it-

Both the Barron's and HBJ packages offer timed tests that closely mimic the questions and multiple choice answers of the SAT. They give scores both as percentages correct and SAT equivalents, and they can highlight the number of correct answers in specific study areas.

Both of these programs are text dependent, relying heavily on textbooks supplied with the disks. They include many practice tests and paper-and-pencil exercises that are particularly valuable training for the SAT. After all, there are no keyboards, monitors, and whirring disk

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EDUCATION

drives on the day of the big examination. On the other hand, the packages from SEI and Krell focus almost exclusively on exercises that don't strive for test simulation. The SEI program, for example, seems to randomly generate two out of three wrong answers for each question from a bank of wrong answers. While this can save memory, it may leave students unprepared for the SAT's carefully chosen wrong answers, which present shades of meaning and can easily mislead the student. The Krell package's answers also seem random, but Krell does offer an optional timer to help students pace themselves.

The Krell and SEI packages are text independent. This means students need not refer to a textbook for questions and answers, but it also means that the material is limited to the space of a disk. Neither program offers the actual paper-andpencil work provided by the Barron's and HBJ packages.

User Interfaces

You should also consider these three additional convenience factors: user-interface program speed, clarity of screens, and user comfort.

The slowest program is Barron's, which often loads only a small set of questions at a time, requiring frequent visits to the disk and making you stare at cute messages such as "Un moment, s'il vous plait" or "I'll be right back."

The SEI and HBJ programs have the most readable screens. They are well-signed and avoid too much information's on the screen at one time. The Barriero on the screen at one time. The Barriero Selfering, however, sometimes clutterl's too much on each screen, and Kttell's package scems uninterested in keeping a clear, easy-to-read work screen. Used they programs from Barron's and HBJ can be cumbersome because you must constantly move between the instructional text and the computer.

In terms of the organization of study materials and documentation, the Barron's system is superior. With a large user's guide, disk menus printed directly on the disks, and emphasized outlines of the program's course, the Barron's package successfully avoids the potential confusion of so comprehensive a proconfusion of so comprehensive a pro-

gram. The organization of all the other programs is adequate; however, the documentation for Krell's package seems a little skimpy in comparison.

Evtr

Any SAT package will cover verbal and mathematical skills, but how many take into account the Test of Standard Written English (TSWE) that accompanies the SAT? Of the four programs reviewed, only SEI's package does not provide direct preparation for the TSWE.

FACT FILE

BARRON'S COMPUTER STUDY PROGRAM FOR THE SAT

Barron's Educational Series 113 Crossways Park Dr. Woodbury, NY 11797

(516) 921-8750 List Price: \$89.95 for 3 disks and 3 text-

books Requires: 128K RAM.

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Computer Preparation for the SAT

Harcourt Brace Jovanovich

1250 Sixth Ave. San Diego, CA 92101 (619) 231-6616, ext. 432 List Price: \$79.95 for 2 disks and a text-

Requires: 64K RAM.

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COLLEGE BOARD SAT EXAM

PREPARATION SERIES
Krell Software Corporation
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Stonybrook, NY 11790
(516) 751-5139
List Price: \$299.95 (expanded series) for

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SAT Skills Set

Sliwa Enterprises, Inc. 2360-J George Washington Hwy. Yorktown, VA 23692

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Each package has something that makes it stand apart from the pack. In the verbal section of the Barron's package, hints follow wrong answers, and the program gives students a second chance to answer a question. The hints are followed by accurate and concise explanations. In addition, the Barron's program offers a fabulous on-line, step-by-step, graphic explanation for every alternate math question. The HBJ package features 1,000 elec-

tronic flashcards. While the flashcards seem clever at first, it soon becomes obvious that regular "hard copy" flashcards would serve the student just as well. Besides, they are easier to use, and you can't carry your PC to the dinner table or keep it tucked into your jacket pocket.

SEI's clear and fast SAT Skills Set has a unique test editor that allows a student (or teacher) to edit the test on disk, A student can change, add, or delete items from any test or even create completely new tests. Students working with a tutor or with insight for what needs to be learned, can put the editor to excellent use. Except for the confusing graphics in its math section, which require that you toggle between a screen with the pictures for four questions on it and a screen with a single question, SEI's program is also one of the ensiest to use

The Highest Grade If you're looking for a comprehensive, guided SAT preparation program that combines the best of both textbooks and computers. Barron's COMPUTER STUDY PROGRAM FOR THE SAT is the package of choice. HBJ's Computer Preparation for the SAT runs a close second, largely because it lacks Barron's program depth and clarity of presentation. Krell Software's COLLEGE BOARD SAT EXAM PREPARATION SERIES runs a distant third because it is unable to match the wealth of materials. careful presentation, and reasonable prices of the first two packages. Finally, SEI's SAT Skills Set, though not as comprehensive as the Barron's and HBJ packages, can offer confident and selfdirected students a good way to sharpen verbal and math skills.



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close friend in a state of euphoria called recently to tell me about a stock he had stumbled across a couple of months ago. "You've got to buy Compag Computer, 1 bought it at \$3 a share less than 2 months ago, and it's already up to almost \$9," he said. "My stockbroker says he wouldn't be surprised if the stock went to \$20 or \$30 a share within the next 6 months!"

Now, experience has taught me that one of the worst things to do is buy a stock solcly on the basis of a tip from a friend, or even a broker. Most of the time, you end up losing money. Not wanting to miss a good opportunity. however, I decided to investigate Compaq Computer through the Dow Jones News/Retrieval (DJN/R) service.

DJN/R is a leading interactive information service with 33 databases and more than 190,000 users. Through DJN/R, you can instantly access current and historical security quotes, up-to-theminute news, consensus earnings forecasts, detailed company statistics, and a wealth of other information.

To book up to DJN/R, I dialed a local

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access number and entered my password. Since I didn't know Compaq's ticker symbol and would need it to retrieve information from other DJN/R databases. I went to the Symbols Directory first.

Each of the system's 33 databases is accessed in the same manner. You type two slashes (//) followed by the appropriate mnemonic command for the database and press Return. The command in this case was SYMBOL; following the prompts in the Symbols Directory quickly led me to CMPO, Compag's symbol.

Using the Databases The Current Quotes database (//CQ)

holds information on how a stock is doing that day. Upon entering the ticker symbol, I found that the stock was already up 75 cents a share from the previous day's closing price of \$8.75 and that almost a million shares of the stock had already traded that day.

The Historical Quotes database (//HQ) lists daily highs, lows, closing prices, and volumes dating back for a year on common and preferred stocks. For overthe-counter stocks, bid/asked prices are shown rather than high, low, and closing prices. You can also obtain monthly summaries dating back to 1979 and quarterly summaries back to 1978

Obtaining daily historical quotes is a nuisance because instead of entering the beginning and ending dates for the period you want, you have to retrieve quotes in blocks of 12 days at a time. For example, to look at the quotes for Compag over the last 60 days, you type CMPO, a space, and P1, and press Return, which retrieves the bid/asked prices and volume activity over of the last 12 trading days. You then con-



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FINANCE

tinue hitting Return for the next most recent set of 12 until you reach 60.

The last 60 days of trading activity for Compaq Computer revealed three things. First. my friend had exaggerated when he asid he bought the stock at \$3 a share less than 2 months ago; the lowest the stock had been in the last 60 days was \$4.12 a share. Second, the stock is 50 a share less than 2 months ago; the lowering the last 2 months and been in the last 60 days was \$4.12 a share. Second, the stock is price had gradually increased during the last 2 months and the stock is a stock of the stock is a stock of the stock is a stock of the stock o

ricker symbol at the prompt. For the year ending December 1985, the consensus forecast of six analysts from major bro-krage firms as \$1 cents per share, with a high of \$1 and a low of 65 cents. The estimated earnings had been revised upward from an expected 44 cents per share 26 weeks prior.

The Media General Financial Services database (//MEDGEN) contains a concise summary of a stock's price and volume data, plus fundamental data on revenues, dividends, and other factors. You enter the ticker symbol, a slash, and then P for price and volume data or F for fundamental data.

Price and volume data indicated that Compaq had been outperforming the Standard & Poor's 500 Index for the last 13 weeks. The 52-week low was 53.50 per share; the 52-week ligh was 59.25; and more than 5 percent of the stock had changed ownership during the previous week of market trading.

Meantime, fundamental data showed

that revenues were up more than 100 percent over the prior year, earnings per share for the last 12 months were 26 cents, no dividends were currently being paid, and, according to the latest SEC report, company insiders had sold 78,000 more shares than they had purchased.

Before signing off, I checked one more source: the Dow Jones News database (//DJNEWS). This database is at the core of DJN/R. Through it, you can access news stories and special features that ran in The Wall Street Journal and Barron's as well as up-to-the-minute news from the Dow Jones News Service.

The Media General Financial Services database contains a summary of a stock's price and volume data, plus data on revenues, dividends and other factors.

This information can be as recent as 90 seconds; induse back as far as 90 seconds; in disaback as far as 90 seconds; of many seconds; properties of the seaffless for news stories specifically about Compaq Competer. There was nothing earth-sharing in the headlines, so I did not retrieve the actual text for any of the stories. However, had I wanted to see the complete text for a particular headline, I could have either the two-letter code to the left of that head-line and pressed featurn.

After signing off. I printed the complete on-line session for further study. To reduce costs, most communications software packages let you save to disk everything that appears on the screen while you are on-line. This enables you to print the information you retrieved after you sign off rather than pay extra connect time charges.

After reviewing the information, I decided that from a fundamental point of view, the company looked good. Revenues were up more than 100 percent from the prior year, and earnings forecasts for the year ending December 1985 had been revised upward to 81 cents per share from an estimated 44 cents 6 months earlier. These figures compared favorably to actual earnings of 26 cents per share for the prior year.

From a technical point of view. Compaq's price and volume activity also looked good. Over the past 2 months, the stock's price per share had been gradually rising with a concurrent increase in volume, and it had reached a 52-week high that day. Also, in the last 3 days, more than 10 percent of the outstanding shares of the stock had traded hands, making one wonder if a takeover bid for the company might not be in the offing.

Time and Costs How much time does this process take, and how much does it cost in online connect charges? First, the time, Using a standard IBM PC with a Haves Smartmodem 1200 and PC-TALK III communications software. I logged on to DJN/R, retrieved and saved the stock's ticker symbol, the current day's quotes, 60 days of historical quotes, the consensus earnings forecast, price/volume data. fundamental data, and headlines of news stories that had appeared in the last 90 days. This took me 4 minutes of connect time at 1200 baud.

It took another 5 minutes to print the complete on-line session on my printer. Since I have considerable investment experience, it took me only about 5 more minutes to review the information after it was printed. Thus in 15 minutes altogether, I had obtained and reviewed the critical information on a company that I had previously known little about.

Retrieving information for a particular company will cost you 20 cents per minute during nonprime time (6 p.m. to 4 a.m. Monday through Friday plus weekends and holidays) or \$1.20 per minute during prime time (6 a.m. to 6 p.m. Monday through Friday, Eastern Standard Time). These charges are based on a standard membership to DJN/R. Either way, when you consider what's at stake, it's a small price to pay.

The Dow Jones News/Retrieval service gives you a practical way to research a company's stock before you invest. If

Thomas A. Mevers is founder and president of the American Association of Microcomputer Investors.

you use the system properly and are se- I lective about the databases you access, you can retrieve a tremendous amount of information quickly and efficiently. And if you are a sophisticated investor who

knows how to interpret this information. using Dow Jones News/Retrieval can help you to make more informed-and, therefore, more lucrative-investment decisions



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Deluxe." Software Digest Ratings Newsletter.

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Charles Spezzano, Whole Earth Software Review, January 15, 1984

"Volkswriter Deluxe ... a simple way to word processing power ... for writers who like to think. Washington DC Capital PC User's Group Vol. 3, #4

"Lifetree ... provides exceptionally helpful and competent assistance to registered owners, and the company's update policies are excellent,"

"In sum, this is a unique wordprocessing program."

John Lombardi, Reviewer, InfoWorld, April 16, 1984 We couldn't have said it

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Safekeeping Your Software

The company safe may protect your valuable data disks from theft but not from excessive heat and humidity. For more peace of mind, you should buy a data safe or install a wooden box in the old safe.

ing. Excessive temperature range, humidity, improper handling, exposure to magnetic fields. When it comes to your software and data files, danger may lurk anywhere. But you can prevent these calamities by taking advantage of one of the most familiar precautions available: the old-fashined safe. Well, maybe not so old fashioned. Safes aren't what they used to be

An entire industry has grown up around the care and storage of magnetic media. There are albums for tape cassettes, plastic desktop file boxes for diskettes, and storage boxes for hard disket. Some storage containers come in a variety of colors for quick identification of the contents. PC owners buy them in vast quantifies, since they give a desk or computer workstation the appearance of neatness and organization.

Unfortunately, such enclosures are usually left on or in the desk at night, exposing them to the possibility of theft or unauthorized copying. Of course, for more protection you can keep these diskette files under lock and key.

The risk of fire is a bit more difficult and expensive) to deal with. Although the average home or office is usually not struck by sudden, catastrophic fires, it is filled with combustibles, which, if ginited, can heat up the room considerably. Even a fire in an adjacent room or building can raise the temperature beyond the safe level for mannetic media.

Many business users who have given some thought to the risk of fire and theft use the company safe to store critical data



disks overnight. Better than leaving them on your desk, to be sure, but far from the ideal solution.

Most safes are engineered primarily for foiling burglary, with little if any insulation for fire protection. Safes labeled "fire safes" are designed for protecting paper documents, not software—a critical distinction because paper, believe it or not, is hardier than a disk or tane.

Another commonly used overnight data depository is the in-floor safe. Such safes are usually cast into the concrete sab that forms the foundation of a building, where, because of their position benath the leat of any potential fire and owing to the insulating properties of the concrete and the earth below, they would seem to be immune from damage. But the concrete may not be autibable insulation, except perhaps for paper documents.

Worse, the contents of an underfloor or underground safe are especially prone to damage from humidity. You should rely on these safes only in an emergency, and then only after using ample silica gel or other means of humidity control.

Sundard fire safes are rated to withstand outside temperatures of 1700 degrees Fahrenheit and higher for 1, 2, and 4 hours, depending upon their rating. The testing standards have been estained. The testing standards have been estained to the standards consistent several European countries and Japan have adopted similar standards. Check your safe's label to determine its rating and for the name of the testing authority, the inside temperature was during the test—an important factor for storage of electronic medial.

To meet UL (or similar) standards for an ordinary fire safe, the inside temperature must not exceed 350 degrees, well below the ignition point of paper but certain death for magnetic media.

Underwriters Laboratories has also set standards specifically for data safes. These call for temperatures to be maintained to the maintain





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BUSINESS

tion. Many have a second inner door.

Some Asian manufacturers have a jumped into the data safe market wan an intovative approach. They have retained the normal fire safe design but equipped their safes with a (sometimes removable) box to house magnetic media. The box is relatively inexpensive because it is made of wood with a plastic laminated overlay. Wood is a good insulator and can withstand the internal temperatures for which the outer fire safes are engineered.

Updating Your Fire Safe

A clever way to update an existing fire safe is to buy an installed box and install it in the safe. Be sure that the box has a sound latching mechanism (not just a spring closure) to prevail to the safe during a fire. Farfecthed? Fire safe during a fire. Farfecthed? Fire safes are often way be justed guide a bit on the way be justed guide g

Designer Data Safes

Some data safes resemble file cabines with sliding instead of swinging doors. These are especially nice if the interior dimensions of the drawers efficiently store the type of magnetic media you use. The single-drawer type is particularly useful if it slides under a work surface to replace or supplement normal deak drawers. This design puts the safe right at your workstation, so that you can store idle data disks at all times, even during working hours.

European safes tend to be equipped with high-security key locks rather than with combination locks. These locks are quite sturdy, and you can easily conflict une the keys to make key copying nearly impossible. A key-locked safe allows quicker access, which is important if you have to open and shut it repeatedly during the day.

Japanese manufacturers take no chances and equip many of their models with both key locks and combinations. During the day, you can leave the combi-

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nation lock unlocked and use the independent key lock to throw the bolts and open the safe. At night, the combination lock gives added protection. Some European safes, offer a dual key lock that re-

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quires both keys to open the safe.

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Excessive humidity can be as harmful as excessive heat. Steel safe interiors are prone to condensation, and the insulation used in some budget-priced models makes them even more vulnerable to condensation. Humidity isn't a serious problem with paper documents, but the UL standards for data safes require relative humidity levels below 80 percent for flexible disks and below 85 percent for tapes and film. A data safe's label may not specify a humidity standard, but UL Class 125 safes are tested to the disk requirements for both temperature and humidity, while a Class 150 label indicates the slightly more permissive tape and

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Mail-Order Safes

Many computer supply catalog houses now offer data safes. Their listed prices may seem to be lower than those quoted by your local locksmith, who probably doesn't sell many data safes-yet. But before you place an order, you should compare delivery and installation prices. Catalog houses generally ship freight collect-the charge can be considerable on a heavy safe. Also, the trucker may not be willing to make an inside delivery. On the other hand, locksmiths who sell safes can install your safe exactly where you want it, attach its base, and check its locking function. Their overall installation and delivery charge may be lower than a mail-order catalog's, too. Catalog houses may not specify whether their data safes are intended for tapes or disks. A Class 125 safe is best if you are using disks, because they can maintain lower temperature and humidity levels. It would be foolish to spend a lot of money

for an inadequate safe. Obviously, off-site storage of duplicate software and data files is an effective way to protect against total fire loss. But even in a remote location, you have to store the duplicate magnetic media in a secure container. A proper data safe or an updated company safe is your best insurance to protect the valuable output from your PC.

Bruce M. Gast is a staff writer with Technology House, in Warren, New Jersey, a group of professional freelance writers who specialize in safety, security, and related subjects.



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gle. Since 1982, the Legal Tech seminars, sponsored by Price Waterhouse, have been collecting many of the vendors vying for the legal market and assembling them all in one place for convenient comparative shopping. The conferences offer 3 days of intensive lectures on managing and applying technology for the law office, as well as the chance to see A Legal Tech conference can make purchasing decisions more efficient and a little less painful.

New York Legal Tech

The first Legal Tech for 1985, held at the Sheraton Centre in New York City from January 28-30, offered lectures on managing and operating computer technology along with hands-on sessions that taught some basic microcomputer applications for the law office. Prepared with the right questions and a fundamental understanding of the management problems and possible solutions, even a computer novice could glean the right information from the exhibitors. For a law firm looking to purchase or update its word processing or time and billing systems, sending a delegate to a Legal Tech conference is a wise investment.

My own purpose in attending the New York Legal Tech was somewhat different. I work in a firm of 180 lawyers, and most of the mechanics of practice are already automated-albeit in need of refinement. As I see it, the prospect of using computers in the substantive practice of law rather than just in the administration of the law office is the most exciting new trend in technology for lawyers. In other words, can a computer help solve the legal problems of my clients, in addition to making the documents I prepare for them neater and the bill I send them more accurate? If a lawyer goes to a convention with this objective, then the Legal Tech approach has some serious limitations.

Management versus Analysis The New York conference concentrat-

rine were 'tox contrene contendant con comparises as management tool for the exclusion of some of the analytical use of comparies, a field in which the Program of the control of the cont

Several software companies have harnessed the PC to manage document-intensive court cases with so-called litigation support packages. Although most of the systems are modified versions of basic database management packages, the customized legal software can be immensely helpful in organizing, sorting,

"Enable is everything Symphony hoped to be".

Quite sumply, this package has so many outstanding attributes that even the worst skeptice of integrated software have to be impressed. The spreadshee its very close to 12–3; the word processor combines the best thinking of Wordstar, MukhiMar, Volkswitzer, and EssyWheter, the data base offers the functionality of dBASE II, but with many of the ease-of-use features of Powerboc, and the program offers business graphics such as the processor of th

IBM PC Update Doomber, 1984

"... as powerful as a collection of stand-alone programs, and it offers the benefits of integration to boot. What's more, it runs in only 192K bytes of memory."

ComputerWorld March 20, 1985

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PC Magazine February 19, 1985

"Enable is one of those programs that can be up and running with most of the features you need in a few hours. As you need more, you can get deeper into the program and learn at your own pace."

InfoWorld January 21, 1985

Enable first in "Performance" rating—including speed and capacity of all modules tested. Enable first in "Versatility" rating—including power and functionality of all modules tested. Enable rated first in overall evaluation of the word processor module.

> Software Digest Ratings Newsletter Rating of 15 Integrated Products December, 1984

"Enable, a five-function integrated system from The Software Group, merits a close look by any individual or organization interested in a solid package that is well balanced in all of its applications."

Popular Computing March, 1985, Paul Goldner, Raymond Hood, Yoram Lirtzman, Michael Wilding

"... if an office is looking to step up to across-the-board integration with a multitude of functions... this is the one program to seriously consider." Personal Computing

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March, 1985

Business Computer Systems January, 1985

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the best value in microsoftware.

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 viewing that record, fenable will automatically display the other 'linked" file.
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and retrieving documents that meet specific criteria. Preset with fields for author, recipient, date, mentioned individuals, and a brief summary, a litigation support package can make responding to a forbidding set of interrogatories a snap. While several vendors offer a document coding and storing service on mainframes or minicomputers useful for large cases, the PC can do the coding and storing for cases involving under 10,000 documents cheaply and in-house.

New Recruit

The Paralegal Institute of Philadelphia, perhaps more attuned to streamlining the lawyer's practice, displayed a new software package called Recruit, designed to assist law firms in hiring new professional talent. Recruit is an integrated package that organizes the résumé information of applicants, sorts the applicants by their desirable attributes, and even drafts the rejection letters to those that fail to make the cut. Although still an administrative aid, Recruit offers a glimpse at the potential of software dedicated to a specific legal task rather than a generic computer function, such as word processing or database management. Among the seminars offered at Legal

Tech, the most promising were the hands-on tutorials that offered participants a chance to learn how to quantify damages in a legal case, build a planning model for the future of their law firms. and use the PC in litigation support, Although well organized, I found these sessions too basic for the lawyer already attuned to the functions of a PC and looking for new ways to use it. Each began with a primer on how to use a spreadsheet and where to find the Enter key, leaving too little time for the application itself.

At the Podium

The most useful information came out of the lecture series in technology for the practicing lawyer. Lawrence Kramer of Ballard, Spahr, Andrews & Ingersoll in Philadelphia gave an entertaining talk on computers in the trusts and estates practice. "Don't go for user friendly," Kramer advised his colleagues looking for software, "go for powerful." He mentioned new packages in estate tax planning and administration but emphasized the value of standard spreadsheet and word processing packages.

Paul Butler of the New York firm of Shearman & Sterling spoke on the use of microcomputers to support a tax practice. He discussed time-value-of-money computations, audit analysis, and even the prospect of taking a portable PC to an IRS settlement conference for instant results. He then talked about one of the more ambitious experiments in integrating the microcomputer into the practice of law. Butler says that Shearman & Sterling gives a PC to every attorney who can justify its use; the firm now has 150 machines in its offices. Each PC is tied to the firm's centralized word processing system, and each is capable of communicating with external databases for legal research and other outside information services. Software is distributed as a supply, and young associates are encouraged to design their own spreadsheets and draft documents at the keyboard.

How is the experiment 'working'?
When asked if the PCs had made he PCs had made he partment more prolitable. Butler candidjud admitted, 'We have no idea, he was have the sense that we're doing thingsfaster.' He focused instead on the parttative benefits, saying he was convinced
that, ''If we not the computers would quit,
when the properties of th

Plans for the Future

Future Legal Tech seminars are for Los Angels from June 11–13 and Chicago from November 12–14. Mary Anne Baggaley of 12–14. Mary Anne 12–1

Norvell E. Brasch is a lawyer associated with the firm of Holme Roberts & Owen in Denver and Colorado Springs.

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Across the Boards

Electronic bulletin boards offer many of the same benefits provided by PC user groups, without the geographical limitations.

ny PC owner with a modem has | free access to a valuable information and communication resource. A growing nationwide system of electronic bulletin boards (BBS) offers computer links that are often more personal, more local, and less expensive than similar services on commercial systems such as CompuServe and The Source. And, they can be more fun than MCI Mail or Dow Jones News/Retrieval Service, Lonely owners of certain PC-compatibles may find solace in a BBS specializing in their brands. A programmer might download the perfect DOS utility or a scientist might save money with a public-domain word processing program that is quite adequate for occasional needs. Or you might have opinions, questions, or a program of your own creation that you would like to share with others. Each BBS is really a community in itself, regardless of the geographical location of its callers. The personality of the bulletin board is generally a reflection of its system operator (sysop), the dedicated soul who maintains the system as a hobby and/or public service.

Common functions of the boards include sending and receiving public or private messages, the transferring of text or program files, and posting of bulletins of general interest. X modern, a popular public-domain error-hecking protocol, is frequently used to transfer binary files, such plications program information, as opposed to strict ASCII text. While you might sit down and write your own BBS software, you could also use one of the three host programs predominantly in use:



RBBS, HOSTCOMM, and FIDO. They are constantly being modified, expanded, and improved, both by individual sysops and for downloadable release versions. For the best historical and current information on a BBS, you should ask a sysop. Most sysops will gladly respond to serious inputifies.

You can contact most boards (see Fig-

Save Typing; Call PC-IRS

PC-IRS, the PC Magazine Interactive Reader Service, has proven to be extremely popular, logging thousands of calls in its first month of operation. It currently contains all of the utilities published in the Programming Column from December 1984 to the present (in .ASM, .BAS, and .COM forms), indexes for Volume 3, and some of the most popular

User-to-User programs. We'll shortly be

ure 1 for a listing of 75 of them) at speeds of 300 or 1200 baud, unless otherwise indicated. A growing number of sysops are showing interest in the new generation of 2400-baud moderns and are experimenting with units that have been loaned or donated by manufacturers.

Communication parameters determine

the rules of communication for a session. The two most common combinations of communication parameters are 8 data bits, no parity, and 1 stop bit (N,8,1); and 7 data bits, even parity, and 1 stop bit (E.7,1). After the modems exchange one of these mating calls or a similar one and connection is established, you slowly hit the Enter key once or twice-but be careful because this may tell the host computer whether to run at 300 or 1200 baud. In most cases, the BBS detects your band rate and parameters and adjusts itself accordingly. You will then begin an interactive, usually menudriven, session with the remote computer. It requests your name, city of origin, and a

adding still more and doing some reader polling.

To try it, hook up your modem (1200 or 300 baud, no parity, 8 bits. 1 stop bit is easiest, but we'll adapt) and—for fullest use—make sure your modem software supports the XMODEM protocol. You can reach PC-IRS at (212) 696-0360 24 hours a day, 7 days a week, and free (except for your pione bill). Crelag Stark

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personal password for future access. BBS's even have unspoken rules of etiquette. For instance, it is considered rude to leave a fictitious name. Similarly, before you log off, you should leave a polite comment about your own interests or reactions to the BBS. A facility for doing this is usually provided as a menu item. Sysops frown upon users who only download software and never contribute original material. Sharing is a common theme on a BBS.

PC Magazine's compilation of some of the top 75 boards is based on accessibility. geographical spread, diversity of interest, youth (newness), survivability (oldness), and currency/frequency of posted messages. These criteria may seem arbitrary

The overwhelmingly favorite topics of interest on all boards are microcomputer hardware, software, and communications hardware and software.

and unfair, but PC primarily wants to recommend reliable BBS's that support a spectrum of interests and are known to welcome serious users. If you poke around on any of these boards you will undoubtedly unearth up-to-date listings of many more BBS's, some of which are devoted to specific geographical areas. While special areas of interest are noted here, the overwhelmingly favorite topics on all boards are microcomputer hardware, microcomputer software, and microcomputer communications (hardware and software). The listed hours of operation refer to the BBS's local time

Bulletin board systems are entering a phase of maturation and are becoming more powerful, flexible, and specialized. However, an increasing number of reports indicate that scores of BBS guests exhibit thoughtless or malevolent behavior. Sysons or businesses have donated thousands of dollars and hours to their systems and have no need of abuse to their psyches and machinery. As a result, some sysops require confirmation of mailing address and phone number with registration before you are given full access to system features, and some systems request donations or a low annual fee. Almost every system allows even the casual user to read bulletins and messages. In fact, this is how PC gath-

ered the phone numbers in this survey. PC Magazine wishes to thank all the system operators and BBS contributors for their help in making this exchange of information possible.

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New on the Market

HARDWARE

SMT PC Controller A low-cost interface board that can control and read data from as many as 128 remote slave cards, located as far away as one mile from the user's system. It can be used in such applications as controlling electric motors, heaters, infrared sensors, switches, relays, A/D and D/A boards, and so forth, accepting instructions from applications written in BASIC or other

languages. The SMT PC Controller uses a pulse-width modulation technique to transmit and receive data from the slave cards, connected to the user's system either through a single co-axial cable or shielded twistedpair wire. Compatible slave cards available from the board's manufacturer include:

· A/D, reading up to 10 analog inputs

· Relay board, controlling as many as eight loads up to 2 amps

Triac card, switching

eight 5 amp/125 VAC circuits · Digital I/O board, programmable for various input/output configurations

in multiples of four . D/A board with two an-

alog outputs and six binary TTL outputs. (List Price: SMT PC Controller hoard, \$199: slave cards, \$149-\$2891 Systems Manufacturing Technology, Inc.

1145 Linda Vista Dr., #109 San Marcos, CA 92069 (619) 744-3590 CIRCLE 661 ON READER SERVICE CARD

Net-Worker A PC network system centered upon an 80186-based file server offering a mass storage capacity of up to 8 gigabytes. A single Net-Worker file server can accommodate up to 4,080 PCs: additional networks can be interconnected for larger installations Each Net-Worker can also support up to 16 automatically queued printers.

Operating systems supported by the network include PC-DOS (MS-DOS). CP/M, CP/M-86, MP/M. and MP/M-86. Net-Worker uses the Arcnet token-passing protocol to speed

throughput and avoid traffic conflicts. Two levels of security al-

low restrictions to be placed

on individual files or PCs. Security provisions also permit individual users' hard disks to be shared by other users, even though portions of the hard disks are screened from access by the network.

The basic Net-Worker configuration includes 27 megabytes of mass storage. one I AN master card and four PC interface cards. Other components in the system include nine-track tape drives, streaming tape cartridge drives, and extensive communica-

tions options. (List Price: Basic configuration, \$9,2001 B-Komp, Inc. 5949 Sherry Ln., #1535 Dallas, TX 75225

(214) 750-KOMP CIRCLE 660 ON READER SERVICE CARD

AD-1 Converter An 8-bit, 8-channel

analog/digital converter that interfaces to the user's system via an RS-232 serial port. Full-scale single-ended voltages can range from 2.5 to 5.0 VDC (adjustable), compatible with a wide range of transducers. Features of the standalone device include solderless/ lugless connectors, DIP switch-selectable baud rates from 300 to 19.2K (with input sample rates from 15 to 960 Hz), an internal interface for additional digital and relay output boards, and a prototyping area with op

amp, configurable by the The AD-1 includes power supply, user's manual, and driver software.



AD-1 Converter, Ozark Peripherals Div. New on the Market Submissions Guide

Owing to the high volume of new product materials received each week at PC, all submissions to New on the Market should follow these guidelines: 1. Include the retail price and details of both hardware and software needed for an end-user to properly use your new product. This includes required

ount of RAM, number and type of drives, operating systems supported, and peripheral equipment needed. 2. Releases should be typewritten double-spaced on one side of the paper. Copies of advertisements may be included, but in most instances we need information than is typically included in an ad. Include telephone contacts for marketing and technical questions. 3. If available, include black & white glossy photos of the product, 4 × 5 inches or larger,

New on the Market does not review products; do not send sample or demo copies of software. All product announcements are run on a space-available basis, at the exclusive discretion of the editor. Please note that it is impossible to guarantee publication of a product announcement for any particular issue.



(List Price: \$189.95) Ozark Peripherals Div. Caldwell Justice & Co., Inc. 7 Colt Sauare P.O. Box 520 Favetteville, AK 72702 (800) 643-4343 CIRCLE 659 ON READER SERVICE CARD

RITEMANII A low-cost dot matrix printer with up to 8K RAM, a print speed of 160 cps in normal mode (reduced to 80 cps in "quiet" mode), and nine built-in character sets to choose from

Other features of the RITEMAN II include proportional spacing and the ability to mix type styles and sizes within a document. The printer can be ordered with a 2K RAM huffer, or. for an additional \$50, an 8K RAM buffer. (List Price: 2K RAM, \$549; 8K RAM. \$5991 Inforunner Corp. Airport Business Cntr. 431 N. Oak St. Inglewood, CA 90302 (800) 824-3044 (213) 453-6688

Twinax 5251-II PC Board A plug-in board allowing the IBM PC to support such mainframe system printers as the IBM 5256, 5224, or 5225. The board features a HOT KEY switch that permits IBM System 34/36/38 equipment to access printers connected to the user's IBM PC. Also, since the board does not use the PC's DMA channel resources, it does not conflict with any hard disk or network cards that are installed in the user's system. Options available with the

Twinax 5251-11 include a companion 5251 D Monitor Card that supports the full 32 attributes of a 5251 screen. (List Price: \$895: 5251 D Card, \$495)

Comark. Inc. 135 N. Brandon Dr. Glendale Hgts., IL 60139 (800) 323-6135 (312) 351-9700 CIRCLE 657 ON READER SERVICE CARD

Stowaway II A removable-cartridge drive in a half-height configuration, offering a storage capacity of 10 megabytes per standard data cartridge. The Stowaway II drive can function as either a primary or secondary drive backup, with the ability to copy files selectively at an average access time of 94 milliseconds.

The cartridge drive is available in three configurations. In the first, the unit is offered as a module that fits inside the user's system. It is also available in a standalone enclosure or paired with an external hard disk subsystem. (List Price: Available from the manufacturer) Great Lakes Computer Peripherals, Inc. 2200 W. Higgins Rd., #245 Hoffman Estates, 1L 60195 (312) 884-7272 FADER SERVICE CARD

SOFTWARE

The Promise An integrated program allowing the user to perform banking, financial recordkeeping, discount brokerage, ticket purchasing, message forwarding, shopping, data retrieval, and other communications tasks from a home PC with a modem. The Promise, which in-

corporates the functions of several different types of communications programs while using a consistent command set and menu structure, is fully integrated to minimize repetitive data entry. The Promise's banking module, for example, allows the user to pay all bills at one time; as bills are paid, the software automatically updates recordkeeping categories, balances checking account records, and carries out tax analysis for use at a future time

Data such as the user's credit card and bank account numbers are entered only once and can be accessed automatically thereafter with single keystrokes. The user can pre-determine the dates on which purchases are to be made and bills paid and let the software carry out the programmed actions unattended. This frees the user





The Promise, Harbinger Home Computer Services

CIRCLE 658 ON

READER SERVICE CARD

from carrying out each transaction personally or risking late payment.

The Promise uses English-language instructions, help screens for every function, a logical progression of menu options, and color coding for different functions when used with a color system. It is compatible with digital mice, permitting the user to choose options on the menus by pressing buttons on the hand-held device. Data on transactions made and the current status of accounts can be displayed graphically as bar charts.

counts can be displayed graphically as bar charts. Aside from the software itself, the program's producer also offers a centralized computer center, accessible by modem through The Promise's menu, that can link the user's system to outside services not normally reachable by modern. (List Price: Software, \$495;

(List Price: Software, \$495; Computer Center fees, \$12-\$15 projected monthly average)

Requires: 256K RAM, two disk drives, PC-DOS 2.x, modem. Harbinger Home Computer Services

1900 Century Pl., #380 Atlanta, GA 30345 (404) 320-1636 CIRCLE 655 ON READER SERVICE CARD

Epsilon 2.0
An editor featuring the

ability to compile and link a program concurrently in one window while continuing to edit files in other windows.

With a simple command,

the user can set up a program to run in an Epsilon 2.0 buffer displayed as a window on the screen. The program's output is captured and inserted in the buffer: input to the program is provided whenever the user types characters in that window. Epsilon 2.0 allows the program to run whenever the user pauses, automatically switching back to the active window when the user resumes editing.

The editor can concurrently run most programs that do not make use of special screen attributes, including compilers, assemblers, linkers, filters, and the DOS command processor. Epsilon 2.0 is modeled on the EMACS editor used on mainframe systems and does not place limits on buffer size, line lengths, or the number of files that can be edited at once. Up to 11 windows can be placed on the screen at one time. each displaying different buffers.

Other features include a macro definition facility that can assign any of the editor's 120 commands to single keys. The editor can also automatically break lines and reformat paragraphs. search and replace text, and transpose words, characters, and lines easily. A builtin context-sensitive help facility presents help screens by command name, key, and topic, and will also reflect any changes the user may have made in the program's command set.



The Seller's Analysis, The TaftCameron Co.

(List Price: \$195)
Requires: 192K RAM, one 360K drive, PC-DOS 2.x.
Luguru Software, Ltd.
\$227 Fifth Ave., #12
P.O. Box 110037
Pittsburgh, PA 1532
(412) 621-5911
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READER SERVICE CARD

The Seller's Analysis

The Seller's Analysis A program for real estate professionals, designed to analyze real estate transactions from the seller's viewpoint. The program can compare different offers, structure counter offers, and compute the tax consequences of proposed deals. Such analysis can aid the user in determining the actual profitability of each offer.

Taxes are computed using either tax schedules or tax bracket methods. The Seller's Analysis can determine what an "all-cash" offer would have to be to equal a specified "terms" offer. For cash sales, the program allows the user to input the specific after-tax return desired; the program will then determine the selling price necessary to produce the desired proceeds.

sired proceeds.
(List Price: \$189; demo, \$5)
Requires: \$189; demo, \$5)
Requires: \$45K RAM, one
disk drive, PC-DOS.
The Taffic Ameron Co.
10800 N.E. 8th. #1015
Bellevue, WA 98004
(206) 451-9303
CIRCLE 6S3 ON
BEADER SERVICE CARD

Asiagraphics W.P. System

A word processing system enabling the IBM PC to generate and process text written in such Asian scripts as Chinese, Japanese, and Korean.

The system employs a unique input word called a DESCRIPTOR to specify characters. This DESCRIP-TOR eliminates the problems normally associated with traditional phonetic inout methods, minimizing phonetic homophone character conflicts. The input method is based

on the pronunciation of the character, using the phonetic systems of Pinyin, Wade-Giles, or Bopomofo for Chinese, and either Katakana or Romaji for Japanese. Hangul or Roman pronounciation is used for Korean language entry. These widely used pronunciation methods simplify learning the Asiagraphics system, since it is based on language skills the user already possesses. (List Price: Available from the manufacturer) Requires: 640K RAM, two disk drives, PC-DOS, Hercules Graphics Card. Asiagraphics Corp. 407 E. Main St. P.O. Box 153 Port Jefferson, NY 11777 (516) 473-8881

8086/88 Unassembler A utility for assembly programming, permitting the user to modify programs for which the original source code is unavailable. It accepts .EXE. .COM. and other executable files as input, producing an assembly source file suitable for modification by a standard macro assembler.

CIRCLE 652 ON READER SERVICE CARD

8086/88 Unassembler can fully unassemble files with up to 1,000 labels (with similar restrictions on the number of segments it can handle at one time). A second version of the software, capable of handling larger files, is also available if desired from the manufacturer

(List Price: \$50) Requires: 64K RAM, one disk drive, PC-DOS. **JBSoftware** 113 W. Monument St. Baltimore, MD 21201 (301) 539-2616 CIRCLE 651 ON READER SERVICE CARD

Privacy Plus

A data security program that uses only two commands-Lock and Unlock-to protect the user's data files. It works with hard or floppy disks, files on either standalone or networked PCs. A special feature allows electronic mail messages to be secured easily.

PrivacyPlus includes two

encryption alternatives: a proprietary "Fast" algorithm, and the DES algorithm approved by the National Bureau of Standards. Other features include a multiple password option. password suppression, file hiding, special errorprevention features, and

more (List Price: \$159; dento disks. \$20) Requires: 128K RAM, onc disk drive, PC-DOS. United Software Security Inc. 6867 Flm St McLean, VA 22101 (703) 556-0007 CIRCLE 650 ON READER SERVICE CARD

Trigger

A program to help managers focus on those areas of their operations that contribute most to productivity and profitability. Trigger monitors key performance areas. identifies exceptions to performance guidelines, and then issues memos identifying the problem, its probable causes, and the action required in order to remedy it.

Trigger works with the user to implement the system and measure the results. then uses the results as feedback to fine-tune the system to the user's situation. It guides the user in the creation of an application knowledge base capable of identifying specific causes. effects, and remedies for future problems. The longer the user works with Trigger, the more specialized the program's knowledge base be-

comes in that particular area. The software consists of three applications disks, an on-line tutorial, and a reference manual that includes case histories and suggested approaches to applications. The first of the three applications disks sets up the software according to the user's particular situation; the second disk updates the program's knowledge base, and the third generates action reports.

Also included in the Trigger package is a computerbased training program, Managing By Exception. which provides background on the managerial principles upon which the software is based. (List Price: \$495)

Requires: 128K RAM, two 360K drives, PC-DOS 2.0, printer. Thoughtware, Inc. 2699 S. Bayshore Dr.

Coconut Grove, FL 33133 (800) 848-9273 (305) 854-2318 CIRCLE 649 ON READER SERVICE CARD



Text-to-Speech:88 A program that translates unrestricted English text, generated by another program or typed from the kevboard, directly into speech. Text-to-Speech:88 is designed to be used with speech synthesizer boards using the SSi-263 synthesizer chip and can be accessed from BASIC or other pro-

gramming languages. It is compatible with the Sonix:88 operating system and Phonetic Speech Editor program, available either as separate programs from Artic Technologies or as part of a package with the SynPhonix 200 Speech Synthesizer Board, All three programs can, with modifications, be made to work with other 8088based, SS-263 compatible products.

Among the features offered by Text-to-Speech:88 is the ability to handle user-defined Exception Tables. Words that are frequently mispronounced

by the software can be manually programmed and stored on these Tables, which will then override the software's translation rules. (List Price: As part of the

SynPhonix 200 package, \$195; program alone, \$50) Requires: 64K RAM, one disk drive, PC-DOS, SSi-263 based board. Artic Technologies 2234 Star Ct. Auburn Hgts., MI 48057

(313) 852-8344 CIRCLE 636 ON READER SERVICE CARD

Vocabulary Prompter An educational program for developing vocabulary skills. Vocabulary Prompter allows the user to develop work files (called Prompts) consisting of words, phrases, definitions or questions for any subject or course of study. The user can study or test himself with the work file Prompts through a

randomized challenge/

Text-to-Speech:88, Artic Technologies

response method of

presentation.

The IBM PC version of this program takes advantage of the IBM character set, permitting words with diacritical marks such as the umlaut, tilde, cedilla, circumflex, and left and right accents to be included in the work files (List Price: \$39.95) Requires: 128K RAM, one disk drive, PC-DOS 2.x.

Jagdstaffel Software 645 Brenda Lee Dr. San Jose, CA 95123 (40R) 578-1643

CIRCLE 635 ON READER SERVICE CARD

Cambridge Spreadsheet Analyst

Enhancement software for Lotus's 1-2-3, allowing the user to validate worksheet models and locate errors in a model's logic. The Cambridge Spreadsheet Analyst can also scan a worksheet for over a dozen conditions likely to indicate problems.

Two interactive modules allow the user to examine the assumptions behind a 1-2-3 model. The cross reference function, XREF, shows both where and how a given cell, range, or 1-2-3 function is used. An interactive PROBE capability permits the user to explore the network of cells that affect a particular formula.

Cambridge Spreadsheet Analyst works directly with 1-2-3 files and uses a similar command structure. Other features of the software include a context-sensitive help facility and a single-key print function.



Cambridge Spreadsheet Analyst, Cambridge Software Collabora (List Price: \$95) Requires: 192K RAM, two

disk drives, PC-DOS. The Cambridge Software Collaborative 56 Garden St. Cambridge MA 02138 (800) 343-0663, ext. 4200 (800) 322-1238 in Mass.

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disk drive, PC-DOS. Molecular Software 915 Lindberg Rd. W. Lafayette, IN 47906 (317) 463-6541 CIRCLE 633 ON READER SERVICE CARD

Requires: 64K RAM, onc

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MP

Mathematical programming software consisting of five systems for solving linear and quadratic programming problems, linear complementarity problems, bimatrix games, and fixed-point problems. Each of MP's five components can be used singly or as part of a larger integrated system, with complete sharing of data between components. (List Price: \$170) Requires: 192K RAM, one disk drive, PC-DOS 2.x. Sci Computing

1167 Wilmette Ave. Wilmette, IL 60091 (312) 251-6657 CIRCLE 632 ON READER SERVICE CARD

Pro Type

A memory-resident program providing instant access to an on-line printer. The program can work with any type or model of printer compatible with the IBM PC including dot matrix, daisywheel, ink jet, laser, and others. Using windows, Pro Type allows the user to start its print functions without interrupting an application that may be running concurrently.

The menu-driven software includes the following operations:

 Typewriter Mode— The printer accepts input on a line-by-line basis. This mode is useful for preparing envelopes and filling forms

· Composition Mode-A built-in text editor for composing short letters or memos with common word processing commands. A single keystroke allows



Pro Type, Photon Software Div., CARE Computer Systems, Inc.

text to be printed when ready.

· Cut & Paste-Selected text from an applications program can be inserted into

a Pro Type edit mode screen for quick printing. Forms Mode— Provides menu access to

user-formatted report forms Font Mode—Provides menu selection of what-

ever print characteristics the user's printer supports. (List Price: \$119.95) Requires: 64K RAM, one disk drive, PC-DOS,

printer. Photon Software Div. CARE Computer Systems, Inc. P.O. Box 1408

Bellevue, WA 98009 (800) 426-2675 (206) 451-8272 CIRCLE 631 ON READER SERVICE CARD Concepts

Computerized Atlas An on-disk atlas permitting the user to display the world globe in 3-D perspective and four colors. Function keys can call up data on any selected portion of the dis-

played globe including size, language, population, latitude, longitude, and the distance between two points.

The program offers several means of locating any point on the globe. The user can use the cursor keys to control the cursor's position directly, or simply type the name of the city or country. For more detail, Concepts Computerized Atlas includes a zoom mode, permitting a specified area to be enlarged onscreen.

The program displays geopolitical divisions for all water and land masses; lon-

gitude and latitude of the cursor is displayed at the bottom of the screen. (List Price: \$69.95) Requires: 128K RAM, one disk drive, PC-DOS 2.x. Software Concepts, Inc. 1116 Summer St. Stamford, CT 06905 (203) 357-0522 CIRCLE 630 ON READER SERVICE CARD



Concepts Computerized Atlas, Software Concepts, Inc.

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The Disk Toolkit NO IBM PC

CARD

A greeting card design program providing the tools to draw ASCII character graphics on the front or back of a card, with either text or graphics on the inner faces. Card designs can be printed immediately or saved to disk for later re-

editing. Written in BASICA. CARD's user-supported menus are simple enough for children to use. CARD uses text graphics and does not require a special color/graphics adapter. (List Price: Free-Send a self-addressed disk mailer and diskette for a copy) Requires: 32K RAM, one disk drive, PC-DOS, BASICA. Smith-Reed Software

P.O. Box 909 Minneapolis, MN 55440 (612) 874-7794 CIRCLE 648 ON READER SERVICE CARD

Action Diagrammer A program editor that graphically represents the actions a program undertakes as a hierarchy of bracketed blocks. Unlike other diagramming systems, Action Diagrammer can present a high-level overview of a program under development and can progressively decompose this representation down to

Action Diagrammer automatically supplies control structure syntax in English. COBOL, PL/I, FORTRAN. C. Pascal, and many fourth-

the level of executable

FOCUS, RAMIS, and ADS/O. The resultant standardized program diagrams simplify maintenance of developed software by graphically depicting consequential effects of proposed changes.

(List Price: \$495; demo disk, \$25) Requires: 256K RAM, two disk drives, PC-DOS 2.x. Database Design Inc. 2020 Hogback Rd. Ann Arbor, MI 48104 (313) 971-5363

CIRCLE 647 ON READER SERVICE CARD

PC-TRIVIA A game program featuring over 500 questions about the IBM PC. One to four players roll an electronic die, move their pieces across the projected game board, and answer questions about the PC's hardware and software, as well as about people in the microcomputer industry. (List Price: \$29) Requires: 64K RAM, one disk drive. PC-DOS.

READER SERVICE CARD BA-MARKABLE RA-MARKABLE LABELS LABELS

generation languages such as RA-Markable Labels, RA-Markable Labeling Systems

Stillwell Software Products 16403 N 43rd Dr Glendale, AZ 85306 (602) 978-4678 CIRCLE 646 ON READER SERVICE CARD

ACCESSORIES

AMARI Furniture Series Hickory-finished furniture featuring contemporary styling, brass hardware accents, and interchangeable components.

The AMARI desk model 5770, offers three desk drawers and a beyeled front edge designed for comfortable use of a computer keyboard. The matching storage hutch, model 5775, features a monitor compartment, a lockable tambourstyle cabinet, and two storage shelves. (List Price: Desk. \$299.95: Hutch, \$149.95) Gusdorf Corp. 11440 Lackland Rd St. Louis, MO 63146 CIRCLE 637 ON

IBM-Style Binders A line of blank binders and slip cases identical to those used by IBM and other soft-

ware producers. Binders and slip cases are available in three thicknesses: 1-inch, 11/2-inch, and 11/2-inch, Each has the same offset "D" rings and cloth finish used for IBM's PC documentation

The minimum order for a binder/slip case combination is five sets: price reductions are set at orders of 24, 97, 240, 500, 750, and 1,000 cete

(List Price: 11/2-inch Binder/Slip Case, \$9.95 each) International Disk 7246 Remmet Ave., #101

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Basic Repair for Your PC-Too Basic?

Two new PC repair books help you scratch the PC's impenetrable surface and give you an idea of what might have gone wrong. but neither is much help in solving the problem.

ooner or later it's going to happen to you. You'll turn on your PC, and your every keystroke will result in an error message. Or worse, it'll send you smoke signals-big black puffs that mean some gremlin is making a meal of your microprocessor.

Before you plead with the IBM Product Center, you'll probably be tempted to pry the lid off and survey the damage. maybe even scrounge around for a hairpin to put in the appropriate place to fix it. All you need to know is where. That's where you'd expect this duo of do-ityourself books to come in. Each one purports to take you to the nirvana of knowing enough electronic engineering to bring your system back from the dead.

If you're afraid of technical diatribes, you'll like Henry Beechhold's The Plain English Maintenance & Repair Guide for IBM Personal Computers. Reading through this light, almost conversational tome is a pleasant, fun dash.

The book starts with a repairman's primer of tools and parts, leads a sight-

The Plain English MAINTENANCE & REPAIR GITTDE for IBM Personal

Computers*

and then gives a few chapters of off-the-

cuff repair and maintenance tips. Were it

better proofread, I would certainly rec-

ommend this book as required reading to

anyone owning a PC or PCir.

HENRY E BEECHHOLD

Too bad no one at Simon & Schuster

seems to have bothered to read or proofread the galleys before sending it to press. How else can one interpret this kind of glitch: Despite the book's orderly progression of page numbers, the contents of pages 66 and 67 are switched with those of pages 68 and 69. All of a sudden, midway and midword into a discussion of diodes, the text takes a com-

seeing tour through the inside of a PC, pletely nonsensical leap that will totally confuse you until you sort it out.

Similarly, part numbers mysteriously only more in-depth, more accurate, and change in mid-paragraph. For instance, an integrated circuit that is first labeled LM358 subtly metamorphosizes into the correct number, LM386, with no explanation at all. Illustrations, which attempt to fit the light tone of the book, often misinform and occasionally fail to correspond with the adjacent text.

Unfortunately, the typesetting and production problems are echoed at the deeper level of editorial content. Some of the recommendations the book makes are doubtful, such as its advice to lubricate disk drives-particularly in the case of the head guide rods. Further, the author does not appear fully knowledgeable about some of IBM's engineering idiosyncracies. The guidance given for installing a second disk drive is particularly flawed. Not only is a vital illustration absent (showing the location of the drive-select jumpers), but the text inaccurately states that you must set these jumpers differently for each of the two drives in your PC. Actually, both PC floppy disk drives are set as drive 1, and IBM's wonderful twisted cable sorts out everything for you. The book does correctly state that the A: drive receives the terminator chip.

The repair advice for fixing a broken trace on a printed circuit board is correct. but it doesn't tell you that the IBM PC motherboard is a multilayer printed circuit board (there are circuit traces hidden below the board surface that might also fail when the upper traces crack) or that

The Plain English Maintenance & Repair Guide for IBM Personal Computers Henry F. Beechhold Simon and Schuster, Inc.

1230 Ave. of the Americas New York, NY 10020 Copyright: 1985 Cover Price: \$14.95 ISBN: 0-671-52864-5

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you might damage lower levels when you try to repair the visible traces.

At times, the text works up a good head of steam for a practical project, then bails out before spilling the details. A

prime example is its advice on how to | build a voltage gooser (a device that may void your computer's warranty if you actually put use it). The instructions read something akin to "just take a power

transformer, a metal utility cabinet, a switch, and an ammeter.'

Despite the smattering of inaccuracies, the overwhelming majority of the introductory material is good, clearly written, and easy to follow. But it requires a good knowledge of electronics and computers to separate the wheat from the chaff-and if you know enough to identify the misleading information, you probably don't need this book. It's a shame that technical faux pas mar this otherwise delightful volume.

Though stylistically more austere, the technical accuracy of Gene B. Williams's Repair and Maintenance of Your IBM PC is generally beyond reproach. If it sins at all, it's only on the side of superficiality.

From a humble beginning, which warns that electricity can be dangerous, it dives into the nitty-gritty of testing everything on your computer that you can easily test.

Unlike Beechhold's book, this volume does not start off with the assumption that you are a dummy. Rather, it presupposes that you have enough knowledge to operate a multimeter. The author does not give step-by-step instructions for making a solder joint, wisely noting that soldering is an art best learned by experience somewhere other than inside a \$3,000 computer system.

Before getting you tangled in microcircuits and short circuits. Williams gives practical hints about checking for software problems and floppy disk problems, including outlining a procedure for saving damaged disks.

After the thorough disk drive test procedure, the text then runs through dis-

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covery and correction of simple circuit board problems. If you follow the book's instructions, you'll end up giving your multimeter a good workout and identifying any defective subassemblies, but the manual falls short of actually telling you how to fix anything-or even how to get parts.

And parts can be a problem. While Williams outlines procedures such as replacing the disk drive door, he leaves out one important facet of the repair process-where to get the replacement drive door. Just try calling Tandon sometime-the company doesn't deign to talk to mere human beings, let alone condescend to mail out a 50-cent part.

Although the book generally delves no deeper than zeroing in on a bad board, it dips down to component level for memory problems and includes a chart to help find and replace defective RAM chips.

In fact, the charts scattered throughout the book, like the one that helps you find bad memory chips, may earn the book its price. The charts highlight the meaning of the mysterious beep error codes your PC squeaks when you turn it on, help decipher Parity Check error numbers, and even point out essential adjustments such as disk drive speed. The charts save you the expense of buying the overpriced IBM Hardware Maintenance and Service Manual and the IBM Technical Reference manual

Perhaps it's too much to expect a single book to teach all the details of the electrical innards of your computer, let alone show you what thingamajig to adjust to make 1-2-3 run again. After all. microprocessors have outmoded thingamajigs, and circuit surgery in a personal computer has become an elaborate ritual requiring an array of test equipment beyond the means of mortals.

Getting Your Kicks

Both Williams's The Plain English Maintenance & Repair Guide For IBM Personal Computers and Beechhold's Repair and Maintenance of Your IBM PC help you find the obvious problems with your PC-the switch improperly thrown, the failing connection, even the bad memory chip. Although the advice they give often amounts to telling you to

the books help show you where to kick and what to check. While neither book can assist you in finding and replacing a bad interrupt controller, either one might | for PC Magazine.

kick a recalcitrant television set, at least | just save you a needless trip to the repair shop when nothing is really wrong.

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Picking the Proper Protocol

Xmodem has been the de facto standard in error-checking protocols. However, Xmodem CRC, Kermit, and Microcom Networking Protocol (MNP) all have something to offer.

he point of computer communications is, quite simply, to send information from one computer to another with as few errors as possible—preferably none. Most users who have spent any time on-line, howevcr, have learned to accept limitations to accuracy. Phone lines are noisy, and noise translates to garbage on the screen and in disk file.

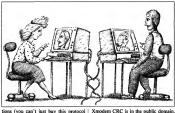
Under most conditions, this garbage isn't a serious problem. If all you're doing is typing at the keyboard or receiving ASCII text files, it's simple to spot and correct errors as you read through the

The situation changes, however, when dealing with binary files, which include program files, that is, LEXE and COM files. As the old joke goes, you have two chances of spotting an error in these nontext files: slim and none. Yet a single error in a program file can be enough to render that program useless.

The bottom line is that error-free communications is sometimes essential, and the only way to guarantee it is through the use of an error-correcting protocol. There are at least four protocols that are of general interest: Xmodem, Xmodem CRC, Kermit, and Microcom Networking Protocol (MNP).

The Standard

Xmodem is a de facto standard in the microcomputer world. Virtually all bulletin boards use it for file transfer, and most popular communications programs include it either as an option or as the only choice for error-free communica-



tions (you can't just buy this protocol separately). For example, you will find Xmodem on CROSSTALK XVI, Smartcom II, ASCOM, Relay, Omniterm 2, and PC-Talk III.

Since Xmodem is such a widespread standard, you might reasonably wonder why you should bother with any other protocol. There are two reasons for investigating other options.

First, Xmodem has some limitations. Second, and perhaps more importantly, some protocols allow file transfer with programs or computer systems that don't know about Xmodem or can't use it. Obviously, the more protocols you have at your disposal, the better.

Sounds Like . . .

Xmodem CRC is sometimes confused with Xmodem. As with Xmodem.

Also, Xmodem CRC divides a file into blocks, sends the file one block at a time, and keeps you posted on its progress, just as Xmodem does. Beyond that, these two protocols have little in common other than their names. They won't talk to each other, and you can't transfer files between them.

The important difference between Xmodem and Xmodem CRC is how they double-check information. Xmodem uses what is known as the checksum method; Xmodem CRC uses a technique that is called the cyclic redundancy check (CRC).

You shouldn't worry about the technical details of either method. What matters is that the CRC approach will catch errors that will get by the checksum approach. Xmodem is designed to be 99.6

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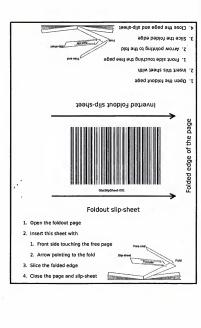
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percent accurate; Xmodem CRC is accurate by a few more tenths of a point.

Given a choice between the two, Xmodem CRC is the preferred protocol, but it is simply not used as widely as Xmodem is. As a result, most programs that have Xmodem CRC also include Xmodem to fall back on. Within any given program, the two protocols are usually set up to act the same way from your viewpoint; the differences only show upbehind the scene.

central on sections. We will have two Xmoderns are take it in any on must set them 6 of data bits, which has certain advantages. As you probably know, ASCII uses only 7 bits per character, but many programs, such as Wordstar, use the eighth carried of their own purposes. The Xmodern setting of 8 data bits lets you training of 8 data bits. Unfortunately, using with the eighth bit. Unfortunately, using since many minicomputers and mainframes can only deal with 7 data bits.

Here's Kermit

Enter Kermit, a public-domain protocol that was originally designed by Bill Catchings, Frank da Cruz, and Vace Kundakci at Columbia University. From your point of view, Kermit is similar to Xmodem in most ways. As with Xmodem and Xmodem CRC. Kermit divides a file into blocks, sends the file one block at a time, and lets you know how the process is going. As with the original Xmodem, Kermit uses the checksum approach to error checking. Unlike either of the Xmodems, however, Kermit uses 7 data bits instead of 8, and that means you can use Kermit on virtually any computer-micro, mini, or mainframe.

Not incidentally, Kermit's use of 7 data bits does not rule out transfer of 8-bit files. When Kermit comes across a non-ASCII pattern in a file, it sends the first 7 bits in one chunk and the eighth bit by itself. The receiving Kermit puts the full 8 bits back together, when it is appropriate to do so.

Kermit also has another important advantage over Xmodem. With either of the Xmodem protocols, you can only send files one at a time. This limitation can be annoving if you are transferring

several files, since you have to hang around in order to send each file separately.

smally seemi allows wild-card transfers, using sistents in the same way that DOS
uses a searches in a DIR command. These
usefurs it you give several list similar name and then send them all wills
single command. Kermit sends the full
filenames along with each file. The
Kermit on the receiving end uses the very
same names when it is saving the files to
disk.

Kermit has not yet been incorporated

Considering the momentum behind MNP, it just might become the protocol of choice before too long.

into any well-known communications program, but several software houses are looking into the possibility. For those who are interested, the PC version of Kermit is available on several builtein boards, including The Invention Factory at (212 v341-1194 and Larry Jordan's TCOMM at (301) 428-7931. You can download it using Xmodern.

The Interesting One

The last protocol on my list is Microcom's MNP, the Microcom Networking Protocol. This one is probably the most interesting of the bunch.

Microcom is a relatively small manufacturer of modems and communications software. The company is trying hard to become an industry leader, and it is

building its reputation with MNP.
MNP originated in 1982 as a proprictary protocol found only on Microcom products. It is somewhat easier to use than Ximodem or Kermit but not easier than some other proprietary protocols you may have heard of. The important hing is what Microcom has done with MNP. From the beginning, Microcom has posted MNP? as the new de factotom of the property of the party of the pany did something than on one else had tried: it encouraged others to licetic.

Gaining Acceptance

This strategy has paid off. MNP has garnered support from such companies as Apple, Tandy, Novation, and IBM (Microcom words IBM's Personal Bommunications Manager, which includes MNP). Uninet is currently in the process of implementing MNP on a limited but growing basis, and according to growing basis, and according to make the process of the process

Microcom may take this last step as early as the fall of 1985. A new version of the public-domain RBBS bulletin board program has just been released. The new RBBS offers MNP as a choice for downloading programs. Microcom was in favor of adding this feature, and I suspect that it won't be long before someone develops an MNP merge file for PC-Tak! II.

Tom Mack, who wrote the new RBBS-PC (Version CPC 12-4A) says that most RBBS bulletin boards should have the new version up and running by the beginning of June. One system that already uses MNP is Microcom's own BBS at (617) 769-9358.

MNP is also likely to be included in a new public-domain program written by Dom Stickle. Stickle, who is responsible for the BBS-TALL upgrade to PC-Talk (see "The Urge to Merge," PC, Volume 4 Number 5), says his new program, D-CUBE, may well be available by early June as well. D-CUBE will first show up on David Pardue's Bungalow Billboard act (615) 385-990; Stickle also intends to include Xmodem, Xmodem CRC, and Kermit in D-CUB Acmit Inc.

Considering the momentum that seems to be gathering behind MNP, it just might become the protocol of choice before too long. It may even succeed in becoming the new de facto standard, as Microcom has always claimed it would. Whatever its final status, however, MNP has certainly become important enough to be taken seriously. Expect to see more of this protocol in the future.

M. David Stone is a frequent contributor to PC Magazine.



Coming Up



Enhancing the AT

IBM's announcement of the powerful new AT last August was received with much fanfare. As users became more familiar with the machine, however, they discovered that it was less perfect than was originally thought. Since then, third-party peripheral manufacturers have labored night and day to supply options that give you more features, greater flexibility, and increased speed.

And now, the challenge has finally been answered. The AT add-on market has come of age, allowing Michael M. Finefrock to assemble "The Ultimate AT, the most souped-up AT imaginable." Along with Dick Aarons and Brian C. Hale, he reviews the best of the new products, showing you ways to cure backup woes, solve disk drive problems, and generally make IBM's creation do far more than the boys from Boca Raton ever planned.

Price Waterhouse Anniversary

One year has passed since PC Magazine published the first Price Waterhouse Report. In this issue, the top accounting firm sums up major developments in the accounting software market and offers some clues about what may lie ahead. Included is a special report on the Price Waterhouse "Hall of Fame" for its favorite features of all the accounting systems it has reviewed.

IFPS/Personal

Execucom's Interactive Financial Planning System is a decision-support workstation that has long been available to mainframe users. PC Magazine reviews the new, lowprice adaptation of this powerful product to the PC environment. It's a product that picks up where spreadsheets leave off.

Microsoft Word 2.0

Diane Burns and S. Venit review the latest release of this popular word processor from a software giant. We'll report on how Word has changed and what has remained the same.

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Microcomputer COBOL

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CPU Accelerator Boards

Users who want to improve the PC's execution speed will be interested in two accelerator boards for the PC that actually boost the speed of the CPU. PC Tech Journal tested two such boards: the Kamerman Labs PC-Excellerator and the Orchid Technology PCturbo-186.

Hard Disk Storage Alternative

The Bernoulli Box, an external drive system from lomega has two 8-inch cartridge drives that each store 10 megabytes of data. PC Tech Journal offers a thorough review of this unique product.

Data Security and the PC

A close look at seven encryption products for the PC-how they work and their relative cryptographic strengths.

Turbo Pascal I/O Library

The first part of this two-part article examines an I/O library that cures two of Turbo Pascal's deficiencies: file handling and screen handling. It explains when, why, and how to use the library and presents solutions to problems of handling path names, tree-structured directories, and I/O redirection. It also provides the complete source code.

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